

Machine and Tool **BLUE BOOK**

ESTABLISHED 1906

NOVEMBER 1951

**Compression-formed Seamless Tubing
Cuts Machining Costs**

Metalworking Plant Holds Rejects To 4%

**New Stacker Crane Saves Floor Space,
Expedites Materials Handling**

Washington News Letter

How's Business?

CONTENTS ON PAGE 5

Only **MARVEL** builds all four*

*HACK SAWING MACHINES

*BAND SAWING MACHINES

*BAND SAW BLADES

*HACK SAW BLADES

While it is true there are several builders of hack sawing machines and many builders of band sawing machines, only MARVEL builds BOTH hack saws and band saws. The fact is that MARVEL manufactures 35 models of 10 basic types of metal sawing machines which include the world's fastest automatic production saw, the world's largest giant hydraulic hack saws, the world's most versatile band saw and the most widely used small shop saws.

With intimate and broad field experience in all types of metal cutting-off equipment and 35 different saws available, it is obvious that MARVEL Field Engineers occupy a unique and exclusive position in the industry. They are eminently qualified to make expert and unbiased recommendations covering the type, size and model of metal sawing equipment best suited to individual requirements—the most efficient, most accurate, fastest, broadest in scope and the most economical.

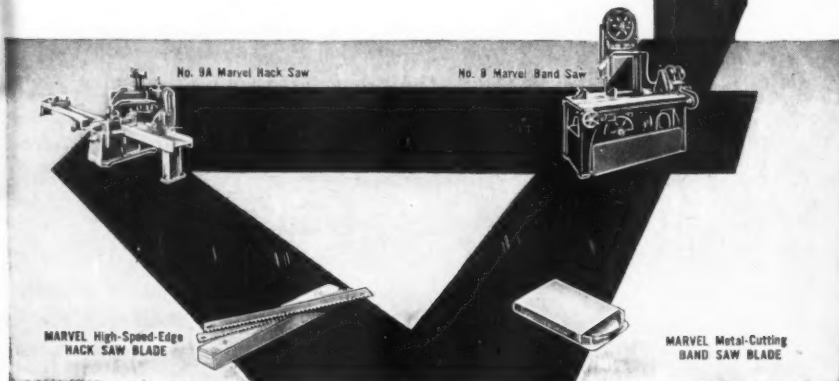
MARVEL is also the only manufacturer of both metal sawing machines and metal sawing blades. Because the efficiencies of both the machine and the blades are interdependent, each upon the capability of the other, expert knowledge covering both saws and saw blades is essential to the proper appraisal of any specific sawing situation. Correct balance of cutting speed and blade life, feed pressure and blade tension are all potent factors in over-all performance. Here again it is the MARVEL Field Engineer who is qualified to provide the comprehensive answer to your question. His job is to help you saw metal most efficiently—his services are available upon request—gratis.

Write for Catalog 49

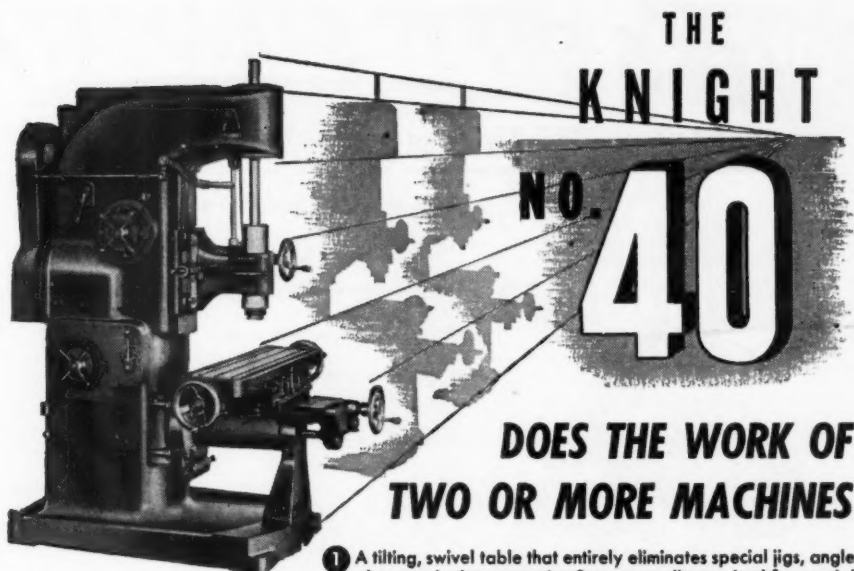
ARMSTRONG-BLUM MFG. CO.

5700 Bloomingdale Ave., Chicago 39, U.S.A.

4



MARVEL *Metal Cutting*
SAWS



DOES THE WORK OF TWO OR MORE MACHINES

Here's Why-

- ① A tilting, swivel table that entirely eliminates special jigs, angle plates and other expensive fixtures usually required for special or complicated milling, boring or shaping jobs.
- ② Exceptional capacity and flexibility make it easy for the Knight No. 40 to do jobs which often require transfers to two or more special machines.
- ③ Sixteen table and spindle feed changes plus four vertical spindle feeds allow the use of a wide range of cutting tools.
- ④ Correctly located full vision controls for direction, speeds and feeds provide the most in convenient, simple operation.
- ⑤ Heavy, strong, one-piece column casting, wide accurate bearings and precision gearing insures the rigidity which means absolute accuracy and long service life.

Mail The Coupon Today For Catalog

W. B. KNIGHT
MACHINERY COMPANY



3920 WEST PINE BLVD.
ST. LOUIS 8, MISSOURI

W. B. KNIGHT MACHINERY CO., 3920 West Pine, St. Louis
Send catalog on Knight No. 40 and other milling machines.

Name

Title

MORE GOODS for MORE PEOPLE at LOWER COST

LET'S GET IT STRAIGHT!

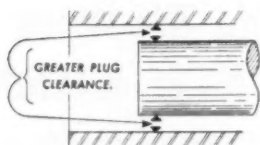
The "DIMENSIONAIR" Air Gage —



EACH GRADUATION IS .00005"
AND NO DOUBT ABOUT IT.



LONGER PLUG WEAR
because of greater JET clearance.



GREATER PLUG
CLEARANCE.



ACTUAL SIZE: 9" x 7 1/4" x 8 1/2"
WEIGHT 17 1/4 LBS.

FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing all types of DIMENSIONAL INDICATING GAGES

IS calibrated accurately over its entire range

IS set accurately with only one master

HAS a range of .003" with 2500 to 1 magnification

HAS much longer plug wear

HAS greater plug clearance so that the same plug can be used on both rough and finished dimension

REMAINS stable for long periods of time

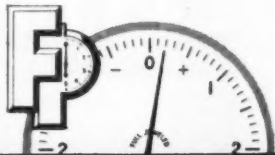
YES, LET'S GET IT STRAIGHT, the Dimensionair uses its own operating principle and new mechanical devices which do away with the limitations common to previous types of air gages.

FEDERAL DIMENSIONAIR PROVES ITSELF

Why not find out to your own satisfaction what the Federal Dimensionair will do for you! Put it to work—discover how the exceptional measuring range of .003" lets you gage irregular shaped and tapered holes. Oil or coolants won't affect the Dimensionair: grit and dirt won't clog it: rough handling won't harm it.

Find out how the Dimensionair can do all this and more—ask our nearest representative to show you the Federal way to better, more positive air gaging, or write to us for complete information and prices.

FEDERAL PRODUCTS CORPORATION, 2511 Eddy Street, Providence 1, Rhode Island.



HARDINGE-SJOGREN

SPEED

HARDINGE
ELMIRA, N.Y.



Collet Chucks with **HARDINGE STEEL COLLETS**



Available in Five Sizes:

1", 1 3/8", 1 3/4", 2 1/4", and 3 1/4" collet capacity.

for Accuracy and Durability

at Low Cost

When you order Hardinge-Sjogren Chucks and Hardinge Steel Collets you get all these advantages:

1. Complete Capacity for Hexagon and Square as well as Round.
2. Lowest Initial Cost.
3. Longest Service Life.
4. Grips both short and long lengths properly.

... and HARDINGE tempered steel collets assure you of quick release, sustained accuracy and durability.

Write for Bulletin 8—
complete information on



HARDINGE-SJOGREN Chucks and Collets.

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE

ARMSTRONG

TOOL HOLDERS



Equip with ARMSTRONG TOOL HOLDERS for Defense production

A change over to new products, starts in the tool room and the die shop . . . starts with ARMSTRONG TOOL HOLDERS. In preparing for defense orders, the logical first step is to check your stock of ARMSTRONG TOOL HOLDERS. With the correct types for every operation, and the correct sizes for each lathe, planer, slotter and shaper, you will be able to start work on a moments notice.

ARMSTRONG TOOL HOLDERS reduce "tooling-up" to the selection of a cutter and tightening of a set screw. They permit oper-

ation at higher speeds, and heavier feeds than are customary—they enable you to produce more pieces per hour, per man, per machine.

Produced by modern methods, in a specially-built tool plant, they are the lowest cost tooling you can buy. And, they are as available as your telephone for they are carried in stock by your local supply house.

Use ARMSTRONG TOOL HOLDERS wherever possible for lower tool cost, saving in High Speed Steel, increased output and greater profit. Write for Catalog



ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"
5208 W. ARMSTRONG AVENUE CHICAGO 30, ILL.

Contents for

As the editor sees it	87
Featured in this issue	89
Last minute Washington news	93
How's business?	93

FEATURE ARTICLES

Metalworking plant holds rejects to 4% by stiff inspection	105
by James Joseph	
Overhead tiering at du Pont, using new stacker crane	119
by Fred A. Miller	
How to improve plant layout and the use of equipment . . . part 1	138
by Dr. Thomas G. Willain	
Compression-formed seamless tubing can cut machining costs	157
by L. A. Karg	
Handicapped workers are efficient, loyal . . . represent untapped labor market.....	174
by Frank Charity	
How to evaluate your supervisor's training program	189
by Edmund Mottershead	
33rd National Metal show	207
Metal show exhibitors and booth numbers	208

DEPARTMENTS

Prof. Reichardt's quizzes	151-220	The Market Place for Employment	
Available literature	225	and Sales Services	337
New books	234	Mechanics through the ages	338
Modern tools in action	251	Products index	340
Shop hints	257	Index to advertisers	346
What's new in metalworking	261		

EDITORIAL STAFF

Wm. F. Schleicher, editor; H. Louis Purdy, new equipment editor; Gerald E. Stedman, field editor.

BUSINESS STAFF

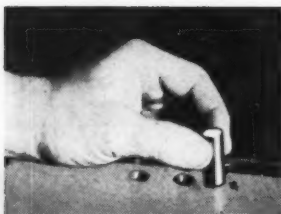
R. C. Van Kampen, president; Vincent C. Hogren, vice president; J. E. Hitchcock, vice president; M. L. Yonts, secretary; R. E. Goodwin, circulation manager

Hitchcock district managers are listed on page

Accepted under section 34.64, P. L. & R, authorized office, Chicago, Ill.

Copyrighted 1951 by the Hitchcock Publishing Co., 222 E. Willow Ave., Wheaton, Illinois





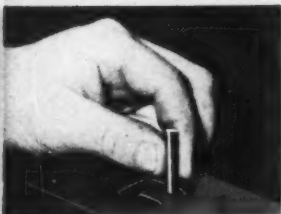
Check hole sizes



and locations,



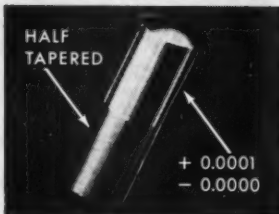
find centers,



gage slots,

and dozens of
other uses with
HORBERG

precision taper



Pin Gages

SAVE TIME AND MATERIALS

Oil-hardened tool steel tapered pin gages accurate to $+0.0001''$ — $0.0000''$ insure dependable sizing and location of holes and slots for machinists, set-up men, tool and die men, inspectors, all who need precise hole measurement.

CONCENTRIC TAPER on lower half of each gage fits holes $0.0012''$ smaller

than standard letter, fraction, and number size drill holes. Makes insertion easier. Permits gaging of odd-size holes and slots.

ALL GAGES are $1\frac{1}{2}$ inches long. Sets contain a pair of each size in a plastic case with 4-place decimal equivalents of each size plainly marked.

ALL ITEMS STOCKED FOR IMMEDIATE DELIVERY

THE *Horberg* GAGE COMPANY

Quantity 21 STAPLES ST., BRIDGEPORT, CONN.

..... Letter sets @ \$45.
52 gages (A-Z)

..... Fraction Sets @ \$50.
60 gages ($\frac{3}{16}''$ to $\frac{1}{2}''$
in $\frac{1}{16}''$ steps)

..... Number Sets @ \$90.
120 gages (1 to 60)

..... Single gages @ \$ 1.

..... Stand alone @ \$10.

Please Rush checked items and literature to

company.....

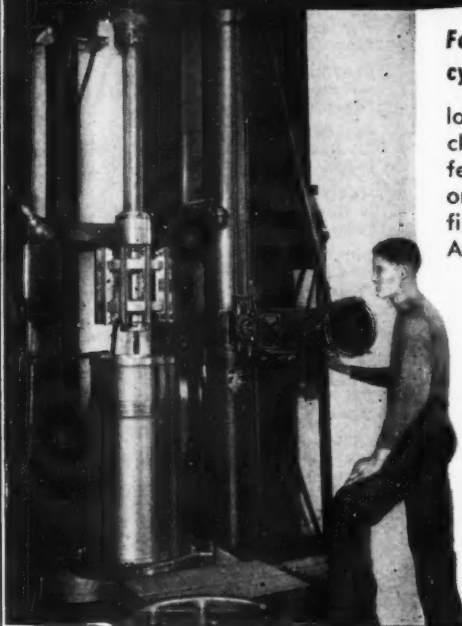
address.....

name.....

title.....

If your production involves finishing
any type of cylindrical bore ranging
from $\frac{1}{4}$ " to 30" I. D. . . .

FULMER HONING WILL DO IT FASTER!



For almost any type of internal
cylindrical surface . . .

long or short, open at both ends,
closed at one end, containing dif-
ferent diameters, ports, shoulders
or interruptions in the surface to be
finished . . . ALL FINISHED FASTER
AND MORE ECONOMICALLY.

• • •
**LARGE AMOUNTS OF
STOCK REMOVED
RAPIDLY**
• • •

Working tolerances as close as
 $\pm .0001$ " can be held on bore
size, straightness, roundness.
Any surface finish from 1 or 2
microinches.

FULMER COMPLETE **HONING EQUIPMENT**

EVERYTHING IN ONE "PACKAGE"

HONING MACHINES — HONING TOOLS — HONING FIXTURES
for quickest and most economical honing write for Bulletin 10.

C. ALLEN FULMER CO.

1242 First National Bank Bldg.
CINCINNATI 2, OHIO

Who to Ask for Information

**ABOUT CININNATI MILLING
SURFACE BROACHING
DIE SINKING • GRINDING
CUTTER SHARPENING • LAPPING
FLAME HARDENING MACHINES**

You can save time by telephoning or writing the nearest Cincinnati representative for literature and information about the machines listed above. For your convenience, addresses and telephone numbers are tabulated here. Why not just tear out these two pages and keep them for future reference? And while you're about it, ask for a copy of our new general catalog, No. M-1712. You'll need it for reference throughout the year.

**THE CININNATI MILLING MACHINE CO.
CININNATI GRINDERS INCORPORATED**
CININNATI 9, OHIO



Our new general catalog No. M-1712 contains information and specifications for all machines in the Cincinnati line. A copy will be sent on request.



FIELD ENGINEERING OFFICES

BOSTON

334 Washington St., Wellesley Hills 82, Mass.
Phone: Wellesley 5-4670 or 5-4671

BUFFALO

1807 Elmwood Ave., Buffalo 7, N. Y.
Phone: Riverside 3402

CHICAGO

104 N. Oak Park Ave., Oak Park, Ill.
Phone: Chicago—Estebrook 8-1905-6 or
Oak Park—Village 8-3804-5

CININNATI

4701 Marburg Ave., Cincinnati 9, Ohio
Phone: Redwood 2121

CLEVELAND

4614 Prospect Ave., Cleveland 3, Ohio
Phone: Henderson 1-4100

DETROIT

426 New Center Bldg., Detroit 2, Michigan
Phone: Trinity 2-2300

HARTFORD

10 North Main St., West Hartford 7, Conn.
Phone: Hartford 3-6271

INDIANAPOLIS

218 Chamber of Com. Bldg., Indianapolis 4, Ind.
Phone: Plaza 7382

NEW YORK

155 East 44th St., New York 17, New York
Phone: Murray Hill 2-5448

PHILADELPHIA

3701 North Broad St., Philadelphia 40, Pa.
Phone: Baldwin 9-9220

PITTSBURGH

1206 Empire Bldg., Pittsburgh 22, Pennsylvania
Phone: Atlantic 1-8162

SYRACUSE

472 South Salina St., Syracuse 2, New York
Phone 2-7249



CANADIAN

B. C. VANCOUVER

B. C. Equipment Co., Ltd.,
B. C. Equip. Bldg., 551 Howe St., Tel. Marine 2511

MANITOBA, WINNIPEG

John Bertram & Sons Co., Ltd.,
214 Enderton Bldg., 334 Portage Ave., Tel. 95-620

CININNATI

MACHINE and TOOL BLUE BOOK



REPRESENTATIVES' OFFICES

ALABAMA, BIRMINGHAM 3

McVoy-Hausman Co.,
2024 Sixth Ave., N., Tel. 7-5561

CALIFORNIA, LOS ANGELES 58

Harron, Rickard & McCone Co. of Sou. Cal.,
3850 Santa Fe Ave., Tel. Logan 5-8361

CALIFORNIA, SAN FRANCISCO 10

Harron, Rickard & McCone Co. of Nor. Cal.,
2070 Bryant St., Tel. Atwater 2202

COLORADO, DENVER 2

Overgard Machine Tool Co.,
234 Commonwealth Bldg., Tel. Cherry 3309

FLORIDA, JACKSONVILLE 3

Farquhar Machinery Co.,
720-728 West Bay St., Tel. 5-7810

FLORIDA, MIAMI 9

General Equipment and Supply, Inc.,
543 Northwest Fifth St., P. O. Box 1470,
Tel. 2-8468-9

GEORGIA, ATLANTA 3

Chandler Machinery Co.,
120 Houston St., N. E., Tel. Walnut 3843

IDAHO, BOISE

Salt Lake Hdwe. Co.,
702 S. Eighth St., P. O. Box 1489, Tel. 3400

LOUISIANA, NEW ORLEANS 6

Dixie Mill Supply Co., Inc.,
Tchoupitoulas & St. Joseph Sts., Tel. Raymond 6101

LOUISIANA, SHREVEPORT 93

Dixie Mill Supply Co. of Shreveport,
200 Edwards St.

MINNESOTA, ST. PAUL 4

Anderson Machine Tool Co.,
2631 University Ave., Tel. Nestor 6548

MISSOURI, ST. LOUIS 3

Robert R. Stephens Machinery Co.,
1706 Olive St., Tel. Garfield 6288-6289-6290

NEBRASKA, OMAHA 8

T. S. McShane Co.,
1113 Howard St., Tel. Jackson 1273

NORTH CAROLINA, ASHEVILLE

Tidewater Supply Co., Inc.,
95 Roberts St., P. O. Box 212, Tel. 2204

OREGON, PORTLAND

Hallidie Machinery & Equipment Company,
525 N. W. 10th Ave., Tel. Atwater 9641

SOUTH CAROLINA, COLUMBIA

Tidewater Supply Co., Inc.,
807 Gervais St., P. O. Box 1138, Zone E, Tel. 26371

TENNESSEE, CHATTANOOGA 1

Noland Co., Inc.,
115 Market St., Tel. 7-1284

TENNESSEE, MEMPHIS 2

Hays Machine Tool Co.,
269 S. Front St., Tel. 5-8314

TEXAS, DALLAS 1

Dave O'Neill Machinery Co.,
2801 1/2 Elm St., Tel. Riverside 2817

TEXAS, HOUSTON 1

Sam H. Penny Machine Tools,
3003 Louisiana St., Tel. Keystone 3839

UTAH, SALT LAKE CITY 10

Salt Lake Hardware Co.,
105 N. 3rd St., W., P. O. Box 510, Tel. Wasatch 425

VIRGINIA, NORFOLK 1

Tidewater Supply Co., Inc.,
501-535 W. 24th St., P. O. Box 839, Tel. 2311

WASHINGTON, SEATTLE 4

Hallidie Machinery Co.,
2726 First Ave., S., Tel. Main 2651

REPRESENTATIVES' OFFICES

ONTARIO, DUNDAS

John Bertram & Sons Co., Ltd.,
Tel. 700

ONTARIO, TORONTO 1

John Bertram & Sons Co., Ltd.,
Room 614 Commerce & Transportation Bldg.,
159 Bay St., Tel. Adelaide 3886-7

ONTARIO, WINDSOR

John Bertram & Sons Co., Ltd.,
16 Imperial Block, Wyandotte St., Tel. 2-1424

QUEBEC, MONTREAL

John Bertram & Sons Co., Ltd.,
319 Drummond Bldg., Tel. Marquette 1356

NATI

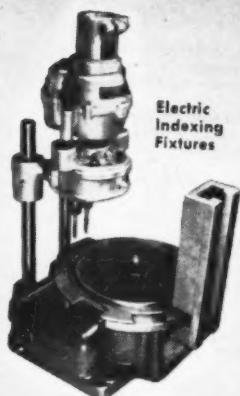
MILLING MACHINES • CUTTER SHARPENING MACHINES
BROACHING MACHINES • FLAME HARDENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID
CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES



**Air-Electric
Tapping
Machines**



**Air-Foot Operated
Tapping Machines**



**Electric
Indexing
Fixtures**

STANDARDIZE ON ETTCO-EMRICK

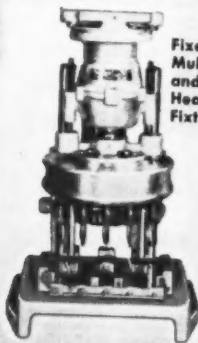
... for all your small parts
drilling and tapping needs!

This world famous line of time and labor saving equipment is sold through leading distributors throughout the United States.

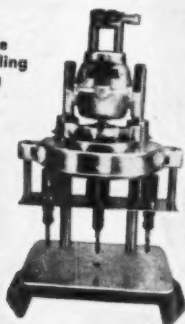
Write for free descriptive bulletins.

ETTCO TOOL COMPANY, INC.

596 JOHNSON AVENUE, BROOKLYN 6, N. Y.



**Fixed Spindle
Multiple Drilling
and Tapping
Heads and
Fixtures**



**Adjustable Spindle
Multiple Drilling
and Tapping
Heads and
Fixtures**

**Keyless
Drill Chucks**



**Tapping
Attachments**



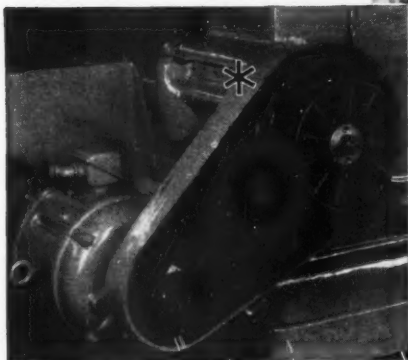
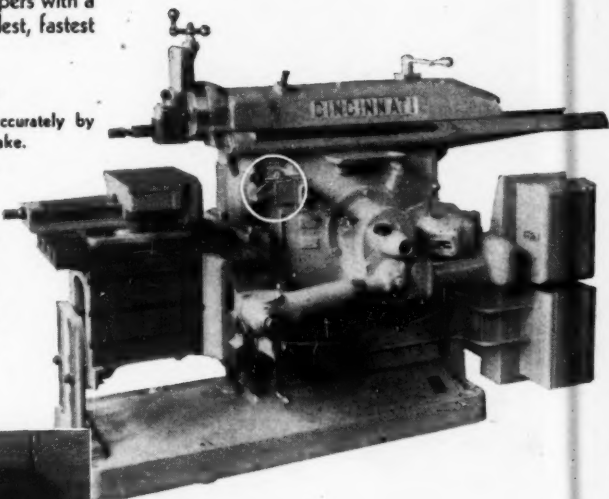
Tap Chucks

* Electro-Magnetic Clutch and Brake - another *NEW* on *Cincinnati Shapers*

Now, with one convenient control the new electro-magnetic clutch and brake start and stop Cincinnati Shapers with a finger touch. It is the simplest, fastest control on any shaper.

Important advantages:

1. Ram is positioned quickly, accurately by instant action of clutch and brake.
2. Starting and stopping by just a light touch.
3. The single control lever is at the most convenient operator position.
4. Clutch and brake operate without grab... are powerful and smooth in action.
5. No adjustment of clutch or brake is required.



This clutch and brake are standard on all new Cincinnati Shapers. They are Warner units which have been thoroughly proven on machine tools.

Write for complete Cincinnati Shaper Catalog N-5



THE CINCINNATI SHAPER CO.

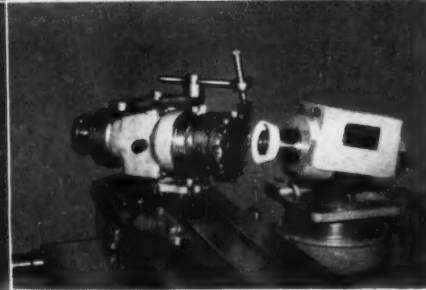
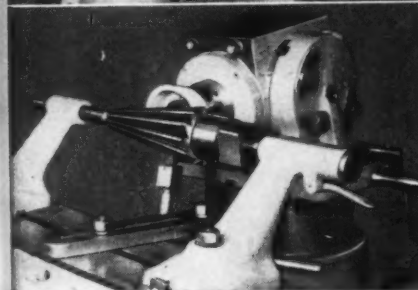
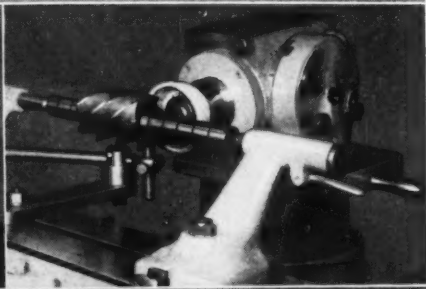
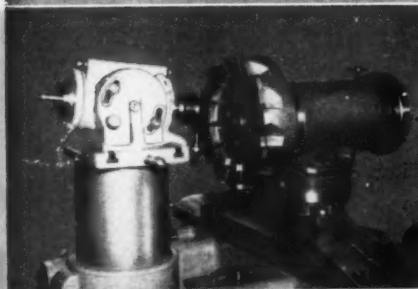
CINCINNATI 25, OHIO U.S.A.

SHAPERS - SHEARS - BRAKES

NEW

with new adjustment

This POPE Motorized Tool and Cutter Grinder SPINDLE



Here's one you've always wanted — a totally enclosed, sealed lubrication, super precision 1 HP, 3600 RPM motorized tool and cutter grinding head, mounted on a new bracket that provides *angular adjustment in a vertical plane*.

POPE Spindles have the radial and axial rigidity to make wheels cut faster — spark out

quicker. Grinding time is reduced. Softer wheels can be used for cooler grinding and for producing the kind of cutting edge that stands up.

Make the most of your present grinders. Equip them with this new and better POPE Spindle.

Ask us to quote price and delivery.

SPECIFY THIS POPE SPINDLE ON YOUR NEXT TOOL AND CUTTER GRINDER

No. 71

POPE

PLAIN STATE REG. U.S. PAT. OFF.

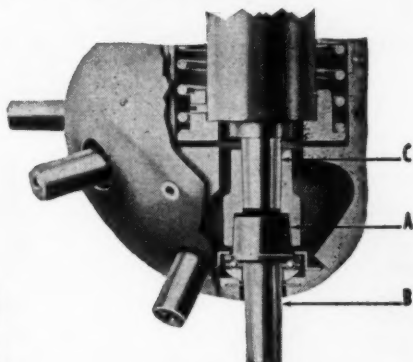
POPE MACHINERY CORPORATION

ESTABLISHED 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS
BUILDERS OF PRECISION SPINDLES

MORE HOLES PER HOUR — PER DOLLAR

Increase production of any standard drilling machine by adding a Lign-o-matic, the only drill turret with the patented, self-centering principle that guarantees sustained accuracy equal to the drilling machine itself.



FOR ALL CONSECUTIVE DRILL PRESS OPERATIONS

PROVED PRODUCTION INCREASE

— Turret indexes faster than tools can be changed or work moved to another spindle. A single Lign-o-matic will release 5 drilling machines for other work and still show increased production and reduced costs on original job.

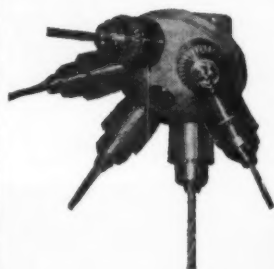
VERSATILITY—Fits any standard drilling machine without altering the machine. Handles operations such as drilling, reaming, counterboring, and tapping (on reversible spindle machines), up to 1/2" diameter in any material.

PRECISION — Patented, self-centering tapered drive (A) automatically locks turret spindle (B) into exact alignment with drilling machine spindle (C) for sustained accuracy.

GUARANTEE — May be returned in 10 days for any reason for full refund of purchase price. Two-year guarantee against defective parts.

PRICE — Model D, 6 spindles with No. 2 Jacobs male taper \$235.00
Chucks extra at established prices.

DELIVERY — Currently, 2 weeks.



☐ Please rush Lign-o-matic turrets for
(drill press make)..... (size).....
(quill dia.)..... (spindle taper).....
My name.....
Title.....
☐ Please send literature on Lign-o-matic turret.
(Attach coupon to company letterhead)

HOWE & FANT, INC.
525 FLAXHILL RD., SO. NORWALK, CONN.



Hand stoning pays off...

INDIA® AND HARD ARKANSAS OILSTONE FILES

shaped to conform to the work surfaces, enable you to do a quick, precision job of fitting dies or machine parts, removing burrs, and touching up cutting tool edges. Machinists and tool and die-makers prefer them because they are *all file* and not just rows of cut teeth. They cut uniformly and without scratching or damaging the surface.

Quick cutting INDIA files are right for general use while HARD ARKANSAS files are the choice for the finest, most accurate work.

WHICH OILSTONE FILES DO YOU NEED?

Catalog No. 19 gives complete specifications on all shapes and sizes of the full Behr-Manning oilstone line. Write for your free copy today. Address Dept. BB-11.



BEHR-MANNING • TROY, N.Y.


COATED ABRASIVES • SHARPENING STONES • PRESSURE-SENSITIVE TAPES

Export: BEHR-MANNING OVERSEAS INC., New Rochelle, N. Y., U.S.A. • Canada: BEHR-MANNING (CANADA) LTD., Brantford, Ont.

INGERSOLL

REPLACEMENT CUTTER BLADES

Carbide, Titanium, High Speed Steel & Cast Alloy



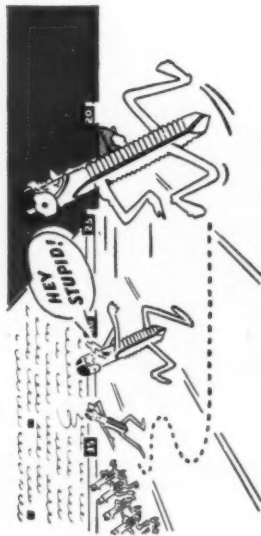
● Our engineers can help you get more production and reduce tool costs by selecting the blade materials best suited to your requirements in milling and boring work.

● They are qualified by Ingersoll's 60 years of experience designing and building milling and boring machines and the cutting tools that go with them.

● Replacement of cutter blades is an important part of our business — so important that we now build seven replacement blades for each blade furnished originally.



THE INGERSOLL MILLING MACHINE CO., ROCKFORD, ILLINOIS



Spiral Point "U" put its team on the field.
Determined its honor, never to yield.
But alas — a dull fullback "clogged" the next play —
He made a T.D. — but ran the wrong way!



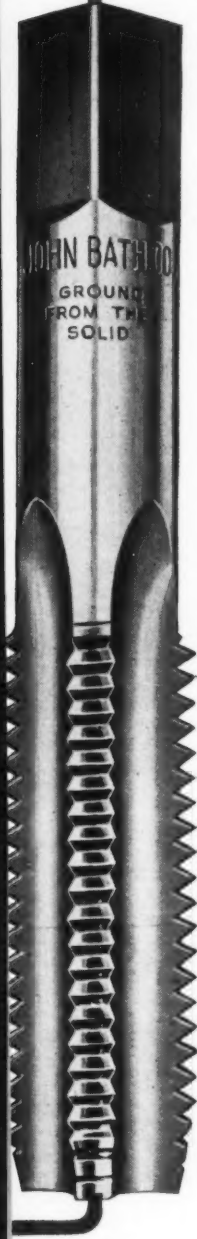
Bath Taps are built for high speed and wear.
In a tight spot, the quality's there.
They'll thread many a "pass", true and complete —
With a clean-cut precision, that cannot be beat.



The Bath Tech "back" in a "T" formation —
"Tapped through center" to create a sensation.
Without any "roughness" — he went through a hole
Swiftly "threading" his way to the Spiral Point goal.



"Ground from the solid" so sharp and strong,
Whatever you "Tackle", you'll never go wrong.
Insist on Bath Taps and you'll find it's true —
They'll earn T.D.'s. (Tap Dollars) for you!



INSIST ON BATH TAPS . . . PROFIT BY THEIR PLUS-PERFORMANCE

A tap, like any other cutting tool, becomes dull with use. A dull tap operates under a severe strain, generates friction and not only produces rough, inferior threads, but is subject to easy breakage.

Sharpen Bath ground thread taps in the flutes as well as on the chamfer, removing only a small amount of material. This will result in more uniform size

holes and better quality threads.

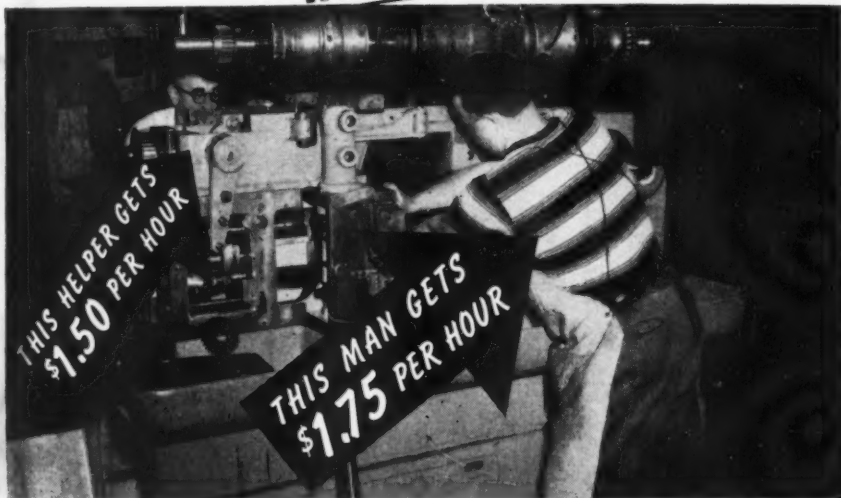
"Hold that production line" by insisting on Bath Taps . . . no need for "subs on the bench" with this famous line of outstanding stars with the T.D. (Tap Dollar) reputations.

Just "give us the signal" and we'll be glad to help you with your threading problems.

PLUG AND RING THREAD GAGES • GROUND THREAD TAPS • INTERNAL MICROMETERS

JOHN BATH CO. INCORPORATED
14 Grafton St., Worcester, Mass.

DON'T BE PENNY WISE *and* DOLLAR FOOLISH WHEN IT COMES TO GEARS



Down time (for disassembly, gear replacement, reassembly) —
4 hrs. minimum **\$13.00**

Loss of 4 hrs. profit and overhead on this job **\$48.00**

Sixty dollars lost because they "saved" ten per cent on a \$10.00
pair of gears by buying inferior gears that quickly wore out and
had to be replaced by BOSTON Gears **NET LOSS**

\$60.00



Standardize on
Stock Boston Gears

Design them into
your equipment

Always specify them
for replacements

BOSTON GEAR WORKS

77 HAYWARD ST., QUINCY 71, MASS.

For information and
prices on over 2000
types and sizes, con-
sult Boston Gear
Catalog No. 35. Free
copy on request.



Spur Gears



Bevel Gears



Worm Gears



Helical Gears



Worm Gears



Sprockets and Chains



Pulleys



Belts and Pulleys



Bearings



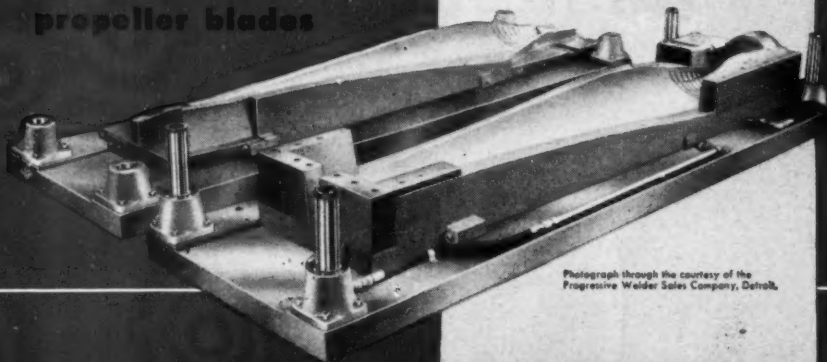
Worm Gears



Worm Gears

HOT FORMING

aircraft
propeller blades



Photograph through the courtesy of the
Progressive Welder Sales Company, Detroit.

DANLY DIE SETS

**CALL ON YOUR
NEAREST DANLY BRANCH
for fast, local delivery!**

Reliable Danly precision plus unmatched facilities for the production of standard or special die sets like the one shown here make Danly Die Sets the first choice of diemakers everywhere. A nation-wide system of branch assembly plants* assures prompt, time saving service.

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue, Chicago 50, Illinois



PRECISION DIE SETS — STANDARD AND SPECIAL



1000 YEARS OF SERVICE TO THE STAMPING INDUSTRY

**EFFICIENT
ECONOMICAL**

**ROUGH GRINDING
AND
FINISH GRINDING**

New

**FOR OFFHAND
GRINDING**

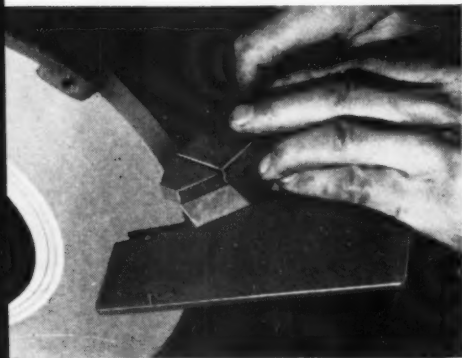
**FOR PRECISION
GRINDING**

**made
only by...**



'XL' BOND FOR CARBIDE TOOL AND CUTTER GRINDING

Assures Efficient Performance at Far Lower Cost



It's really big news . . . this new "XL" Bond! "XL" is the name of Chicago Wheel's remarkable new line of silicon carbide vitrified grinding wheels . . . especially made for carbide tool and cutter grinding.

"XL" wheels come in the most popular tool and cutter sizes and steel backs. They're designed for efficient, economical, rough and finish grinding . . . offhand or precision automatic. And they're already proving themselves on the job, helping to keep the nation's carbide tools and cutters in first-class shape for the mobilization program. "XL" is unexcelled . . . and another 1st for Chicago Wheel!



Chicago Wheel's "XL" Bond is the answer to today's acute shortage of grinding wheels for tool and cutter sharpening. Like all of Chicago Wheel's top-quality abrasive specialties — Mounted Wheels and Cut-off Wheels as well as Grinding Wheels—these "XL" Bond wheels are backed by over half a century of specialized experience. Write today for complete details.

Chicago Wheel & Mfg. Co., Dept. MT
1101 West Monroe St., Chicago 7, Illinois

Please send us literature and engineering report on the new "XL" Bond Silicon Carbide Grinding Wheels.

Name _____

Firm _____

Address _____

City _____

Zone _____


State _____

OFFICES IN PRINCIPAL INDUSTRIAL CENTERS

CHICAGO WHEEL & MFG. CO.

1101 West Monroe Street, Chicago 7, Illinois




Checkmate **RIISING COSTS!**
...WITH SPECIAL
CUTTING TOOLS FROM
NATIONAL TOOL CO.
 CLEVELAND 2, OHIO
 REPRESENTATIVES IN MAJOR INDUSTRIAL CENTERS



LW

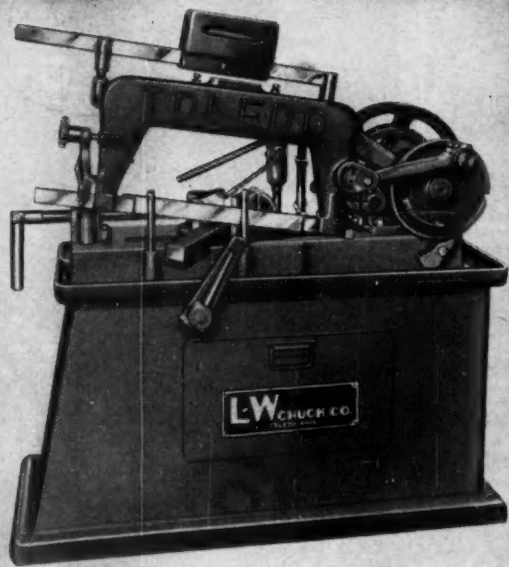
**FIRST CHOICE with those who want
HIGH QUALITY, HIGH SPEED**

POWER HACK SAWS

ONLY
\$283⁰⁶

Stops automatically on completion of cut. Automatic relief of saw blade on non-cutting stroke. 6" x 6" capacity using 10" x 14" blades. 12" x 3" clutch pulley. Pulley speed 120 r.p.m.

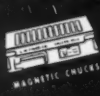
Coolant pump base. Swivel vise for angle cuts. All steel welded base and table. V-belt drive. Rigid frame. Gravity feed. Length gauge. Expanding clutch. 3-speed (90 to 130 r.p.m.) V-belt motor drive arrangement, \$29.31, less motors. 1/2 H.P. 1725 r.p.m. motor recommended. Completely Motorized with Switch; Single Phase \$375.74; Three Phase \$382.53.



Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



DEMAGNETIZERS



MAGNETIC CHUCKS



DIVIDING HEADS



RECTIFIERS



DEMAGNETIZING SWITCHES



LATHE CHUCKS



UNIVERSAL CHUCKS



POWER HAIR LAMP



MILLING MACHINE VISES

L-W CHUCK COMPANY

23 SO. ST. CLAIR ST.
TOLEDO 4, OHIO

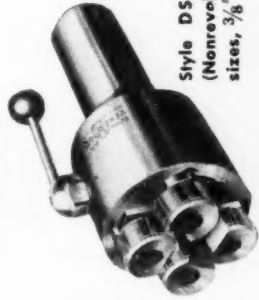
PRECISION by the PILE



WITH
NAMCO
GROUND THREAD
CIRCULAR CHASER
VERS-O=TOOLS

When you use Vers-O-Tools, these workpieces are so typical that we lump them all together and measure them as precision in bulk. More properly, the samples of successful Vers-O-Tool work would be measured in terms of *tons*—for we've licked many a tough production problem: pressure-tight threads, dry-seal threads, API threads . . . and for all uses including aircraft, munitions, tanks, rockets, fine instruments as well as the usual commercial parts.

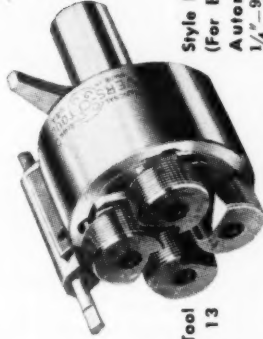
This is no ordinary success story. The selection of Vers-O-Tools for each of these applications is based on a proved-in-use record of superiority on each of three counts: accuracy and fine finish, longer tool life, increased production. These, in turn, stem directly from the Vers-O-Tool's unique design and construction features. For complete details on how Vers-O-Tools ground-thread-chaser can improve quality and cut costs in your shop, ask for catalog D-51.



Style DS Vers-O-Tool
(Nonrevolving Type) 9
sizes, $3/8"$ — $47/8"$.



Style DR Vers-O-Tool
(Revolving Type) 13
sizes, $3/16"$ — $47/8"$.



Style DBS Vers-O-Tool
(For Brown & Sharpe
Automatics) 3 sizes,
 $1/4"$ — $9/16"$.

The NATIONAL ACME CO.

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley 4-6 and 8 Spindle Bar and
Chucking Automatics • Single Spindle
Automatics • Hydraulic Thread Rolling
Machines • Automatic Threading Dies and
Taps • The Chronolog • Limit, Motor Starter
and Control Station Switches • Solenoids
Centrifuges • Contract Manufacturing

LAYOUT FLUID

FOR ANY METAL

Send for

FREE SAMPLE

Your local supply house carries Dayton Rogers' Layout Fluid.

Applicable to all metal. One merely wipes the surface clean and then brushes on the Layout Fluid.

Dries Instantly. No waste. Scribed lines are pronounced and contrast to the dark blue background, thus relieving eyestrain.

Assures greater accuracy and speeds up work. You will save time and money on all layout jobs.

A sample is waiting for you. Send for it today.



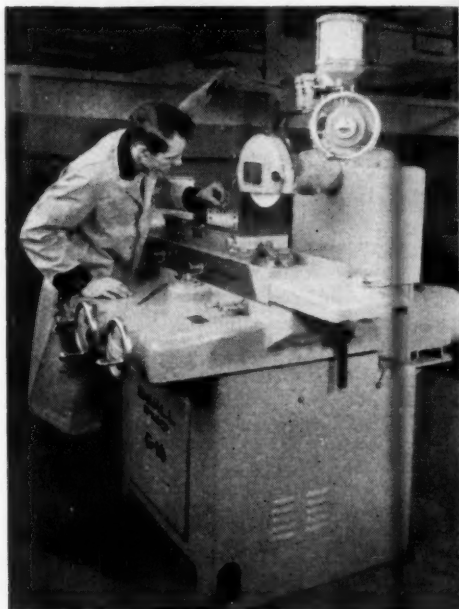
DAYTON ROGERS
Manufacturing Company
MINNEAPOLIS 7, MINNESOTA

UPS PRODUCTION 25% BETWEEN DIE GRINDS

DoALL "COOL-GRINDING"

U.S. PATENT NO. 2470350

GIVES
IMPROVED FINISH
ON HIGH CARBON
HIGH CHROME
NN STEEL



"COOL-GRINDING" WILL PREVENT BURNED OR
SCORED FINISH, LENGTHENS THE LIFE OF YOUR TOOLS



"Cool-Grinding" takes liquid in at the hub of the wheel, and through centrifugal force passes it through the pores of the wheel and out as a fine mist at the point of contact between the wheel and the work.

ONWARD Manufacturing Company, Ltd., Kitchener, Ont., knows the benefits of DoALL "Cool-Grinding." They say, "Since using this Grinder with "Cool-Grinding" we have obtained a 25% increase in number of pieces per die grind over former methods of grinding."

WHY? Because DoALL "Cool-Grinding," with coolant flowing through the wheel, prevents excessive heat that scores, draws the temper or checks the metal finish. The finish is smoother, too. The die does more work before it needs grinding. You save time and money and material. Ask to have a Free DEMONSTRATION of DoALL "Cool-Grinding" at your own plant. Call your local DoALL Sales-Service Store or write:

SEND FOR CATALOG Today

—see how "Cool-Grinding" works, why it is better, how it will benefit you —see the different models of DoALL Precision Grinders for toolroom or production work.



INDUSTRY'S NEW TOOLS

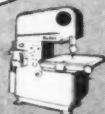
THE DoALL COMPANY • 254 N. LAUREL AVE. • DES PLAINES, ILL.

27 SALES-SERVICE STORES

DoALL



GR-2



Machine Tools . . . Gaging Equipment . . . Tool Steel . . . Band Tools . . . Metal Working Supplies



"SLASH

YOUR SET-UP TIME

WITH THE

TREE

TAPER BORING TOOL"

Cut expensive set-up time from hours to a few minutes with the revolutionary TREE taper boring tool. You can use it on your present milling machine, jig borer or boring bar. Write today for complete information. In addition to boring taper holes this tool can be used for—



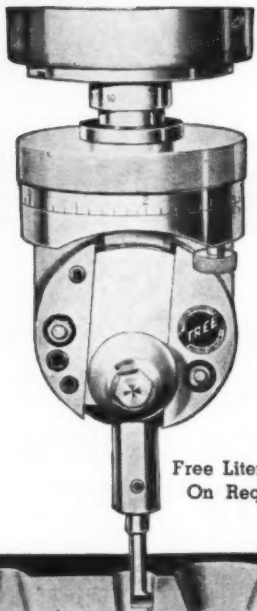
- Straight boring . . . as shown at left used as offset boring tool.



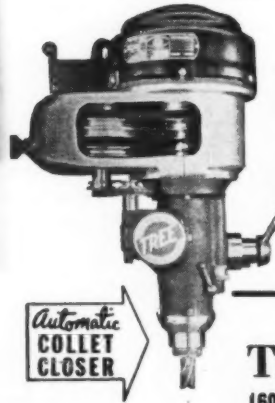
- Facing . . . up to 10" in diameter.



- Outside Turning . . . either straight or tapered up to 8" with extension bar.



Free Literature
On Request



Automatic
COLLET
CLOSER

TREE

**UNIVERSAL MILLING
HEAD ATTACHMENT . . .**

All Angle Milling, Drilling & Boring.
Compact Design, 3/4" Collet Capacity.
4" Quill Travel. **Power Feed Eight Speeds—**
140-3500 RPM or 210-5200 R.P.M. Hardened
& Ground Spindle & Quill. Enclosed
Micrometer. Depth Stop.

For Full Information — Write Dept. B

TREE TOOL and DIE WORKS

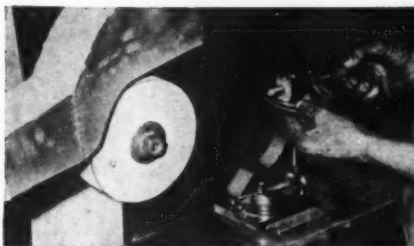
1600 Junction Ave.
Racine, Wisconsin

Export Address:
STATES TRADING CO.,
401 BROADWAY,
NEW YORK 13, N.Y.
Cable Address: "STRADESO" N.Y.

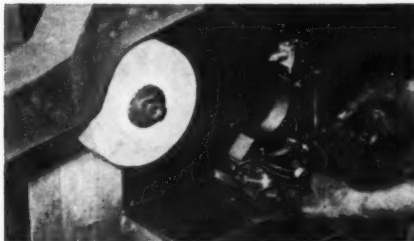
HOW A J & S "Fluidmotion" WHEEL DRESSER *cut production costs*

FOR THE ADAMAS CARBIDE CORPORATION

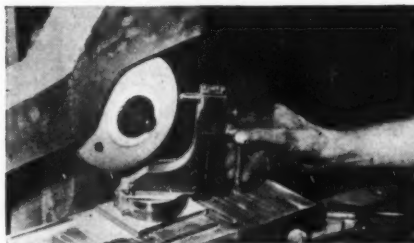
Paul C. Boniti, Shaping and Forming Supervisor of the Adamas Carbide Corporation, Harrison, N. J., reports that his standard Model "E" J & S "Fluidmotion" Wheel Dresser has



1 To set-up for convex radius, first mike distance from diamond point to micrometer plate, then add radius desired. (For concave radius, subtract).



2 Slide dresser in dust-proof channel till mike slips over pins as shown and lock with socket wrench. Dresser is now ready for action.



3 Bring diamond point up to center line of wheel, rotate dresser on swivel base in one continuous motion. A clean, accurate radius results! No chatter marks.

OTHER "Machine Shop TIME SAVERS" by J & S
J & S "All-Purpose" Jaw Clamps, KOALA Circular Cutting Tool,
"Down-Hold" Vise Jaws, and "Attachable" Parallels. Write for
"Time Savers" Booklet.

- Cut set-up time
- Cut dressing time
(save on diamond and wheels)
- Cut maintenance cost

In 4½ years grinding presintered carbide has cost
\$17.50 to maintain — less than \$4.00 per year.

HOW "Fluidmotion" saves time is demonstrated at left. Photos taken at Adamas Carbide show how a concave or convex radius—accurate to .0001" can be obtained in three simple steps.

Dressing two angles tangent to a radius is simple. Only one more step is necessary. After radius is set (steps 1 and 2) the dresser is swung on its graduated base to first one angle, then the other, and both are locked in with a turn of the knurled knob. Actual dressing is again accomplished in one continuous motion—it is not necessary to move the dresser on dove tails to form the angles.

It is important in our work to have a rigid dresser that can dress a wheel true consistently, leave no chatter marks, and still not have the abrasive content in the presintered material affect the accuracy of the dresser. This I can personally vouch for. J & S "Fluidmotion" in 4½ years has passed this test. I have complete confidence in "Fluidmotion"—no trial and error in order to obtain accurate forms. Our company has enjoyed the lower production cost made possible by "Fluidmotion's" repeated accuracy and ruggedness. It's a cinch to do our grinding jobs.

Adamas Carbide, well known for its high quality, low cost carbide blanks, attributes a fair share of its success in attaining more efficient production to its J & S "Fluidmotion" Wheel Dresser.

You, too, can also cut production costs by employing the J & S "Fluidmotion" Dresser in your tool room.

Application to any surface or cylindrical grinder is quick, simple. Set-up and dressing time is yet the lowest to be found.

Wheel Dressers made to dress wheels accurately up to 36" in diameter, and designed to meet your grinding requirements.

*Reg. U. S. Pat. Off.

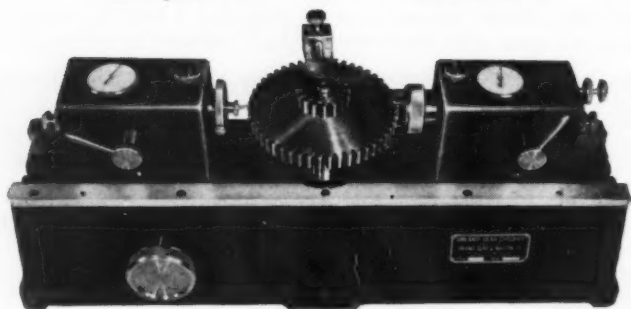
For details, write to:

J & S TOOL CO., INC.
471 Main Street, East Orange, N. J.

Representatives in Principal Cities

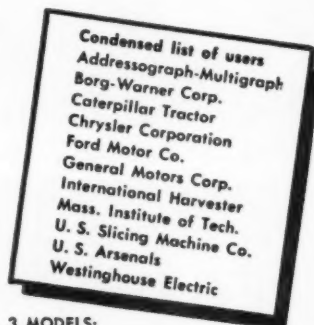
ORLANDI *Gear Checker*

Simple • Fast • Accurate



MAKES GEAR CHECKING SO FAST AND INEXPENSIVE YOU CAN USE IT AT EVERY PRODUCTION STAGE, BLANK TO FINAL, AND REDUCE THE COST OF SCRAP!

CHECKS P. D. (with pins or balls) of spur, helical and worm gears . . . **CHECKS** concentricity (no master req'd) of spur, helical (R. or L.) and worm gears . . . **CHECKS** parallelism of spur gears . . . **CHECKS** helix angles . . . **CHECKS** tooth spacing, tooth to tooth or 180° . . . **CHECKS** concentricity of gears also with masters as a rolling fixture . . . **CHECKS** backlash with mating gears with rolling fixture attachment or pins . . . **CHECKS** P. D. of any thread form with 3 wires.



Condensed list of users
 Addressograph-Multigraph
 Borg-Warner Corp.
 Caterpillar Tractor
 Chrysler Corporation
 Ford Motor Co.
 General Motors Corp.
 International Harvester
 Mass. Institute of Tech.
 U. S. Slicing Machine Co.
 U. S. Arsenal
 Westinghouse Electric

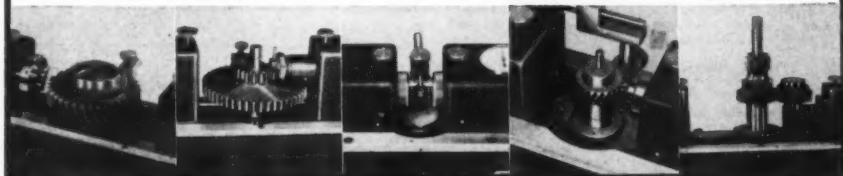
ORLANDI GEAR & MACHINE CO.

Manufacturers of fine pitch precision gears
 16195 Meyers Rd. • Detroit 35, Mich.

3 MODELS:

0"-6" P.D.	\$1175
0"-10" P.D.	\$1550
0"-15" P.D.	\$1965

Attachments Extra
 Larger models on special order.



HOW BENEFITS FROM DoALL BAND MACHINING

• • • • •
DOES WORK FASTER;
CUTS ALL KINDS OF SHAPES;
MACHINES BRASS, BRONZE, ALUMINUM,
CAST IRON, STAINLESS, HARD TOOL STEEL;
GETS FINER, MORE ACCURATE CUTS

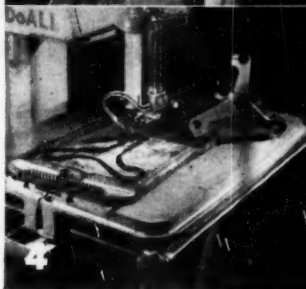
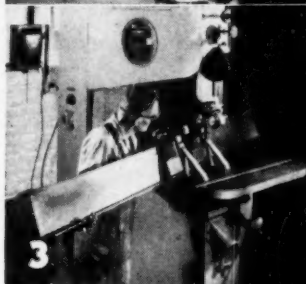
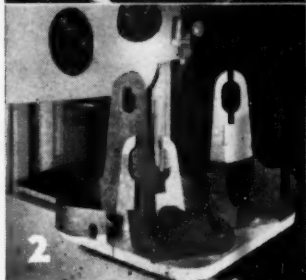
1. Circular parts cut automatically using disc cutting attachment and hydraulic power feed.
2. Sheet steel parts for packaging machinery produced quicker by friction sawing.
3. Friction sawing steel channel on DoALL Zephyr Band Machine.
4. Contour sawing irregular shapes from solid steel 2" thick by 14" square.

AT National Biscuit Company's machine shop in Evanston, Illinois, DoALL Band Machines really earn their keep. They work all the time on all kinds of jobs. They cut any material—even the hardest steel. One job originally calculated to take a week's time was done in three days on the DoALL MP-20. Other work formerly done on milling machines is now done much faster at less cost on DoALL's.

You can have benefits like these. Ask to have a FREE DEMONSTRATION of a DoALL Band Machine in your own plant. Call your local DoALL Sales-Service Store or write:

THE DoALL COMPANY

254 N. Laurel Ave. • Des Plaines, Illinois



Learn about jobs that DoALL Band Machining can do for you. Find out about blades for cutting every material; how you can saw, grind, hone, polish, friction saw—cut any shape. Write today.

B-2-S

Industry's New Tools



27 Sales-Service Stores



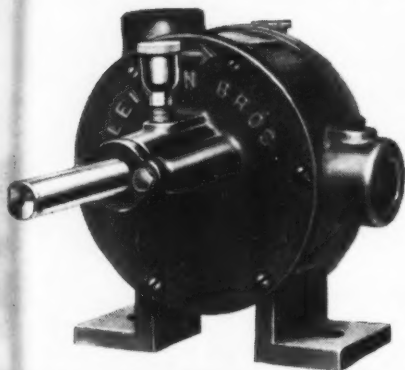
Machine Tools . . . Gaging Equipment . . . Tool Steel . . . Band Tools . . . Metal Working Supplies



All these are
"LOW PRESSURE"
AIR JOBS

Agitating—blowing—holding—
 chucking—sorting—cleaning—drying—
 cooling—separating—mixing—feeding—
 leak-testing—pressure-boosting—
 materials transfer, etc.

—handled better, at lower cost, with



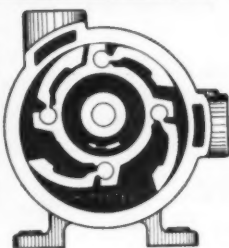
LEIMAN AIR PUMPS

(Pressure, Vacuum, Suction)

On hundreds of air applications requiring pressures lower than 25 p.s.i. or vacuum under 29" mercury, Leiman Rotary Positive Air Pumps are providing these advantages over any other source of air:

TAKE UP THEIR OWN WEAR

Exclusive Leiman hinged wing design permits wings to wear uniformly, maintaining full pressure or vacuum, after 15 and 20 years' steady service.



- Even, pulseless flow of air.
- No expensive installation, no tanks.
- Air available instantly—no waiting to build up pressure.
- No waste—runs only when air is needed.
- Very compact and portable—plug in and use anywhere.
- Provides both pressure and vacuum-suction from same source, by switching from outlet to inlet.
- Extremely quiet and trouble-free for years.
- Little or no maintenance.

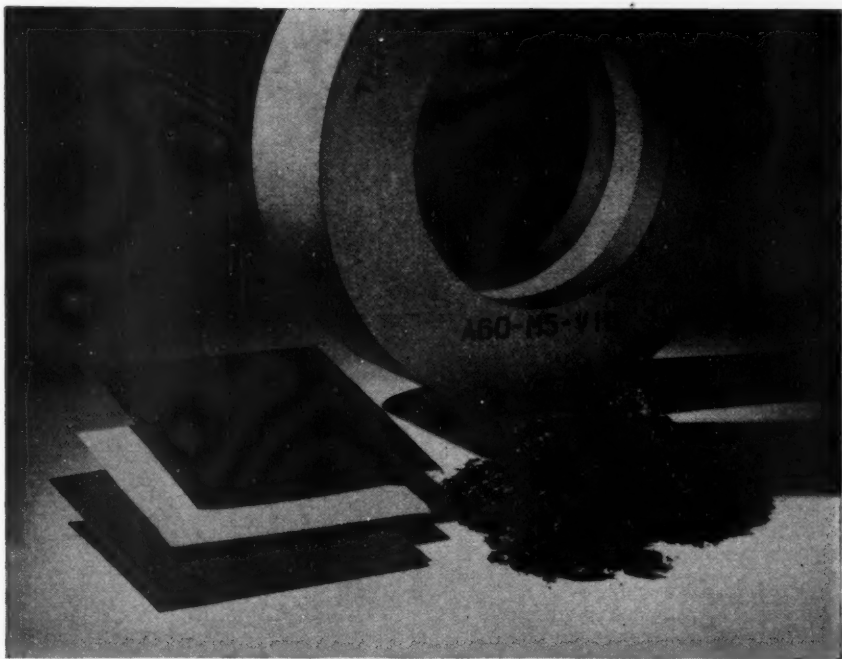
WRITE on firm letterhead, for free catalog and application folder.

LEIMAN BROS., Inc.

173 Christie St., Newark 5, N. J.

*What is your operation or problem?
 Send us details for recommendation,
 without obligation.*

AIR PUMPS • AIR MOTORS • SAND BLASTS • DUST COLLECTORS



A complete line for complete results

Do you know when you are realizing the best available efficiency in your abrasive methods? Chances are, you're getting close if you buy abrasives by CARBORUNDUM. A *complete* line of abrasive products makes it possible for experienced CARBORUNDUM salesmen and distributors to recommend, and for you to select, that single abrasive product that will give you *complete* results. With the right product, you know you're operating at top efficiency, get-

ting the most out of your abrasive methods, saving expenses, producing better.

Best of all, if an improvement comes along that is even *more* efficient than the abrasive product you are using at present, chances are a CARBORUNDUM salesman or distributor will be the first to know and recommend it to you.

Are you sure you're getting *complete* results? Your CARBORUNDUM salesman or distributor can tell you. Or write Dept. BB 80-27.

Only **CARBORUNDUM**
TRADE MARK

makes ALL Abrasive Products...to give you the proper ONE

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company, Niagara Falls, New York.

COMPARE FOR FEATURES COMPARE FOR PRICE ... you'll choose the **LUCIFER Furnace!**

Pore over specifications and manufacturer's data sheets and you'll end up buying the LUCIFER Furnace every time!

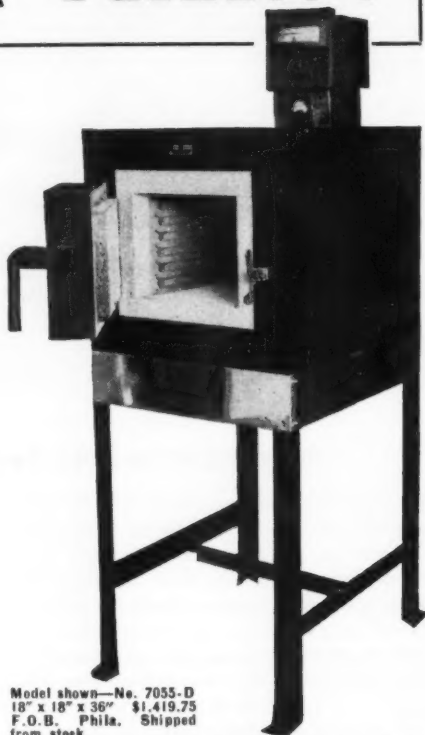
Whether its the Lucifer 6"x6"x12" furnace at \$467.00 or the model shown at \$1,419.75 for 2000° and \$1,629.50 for 2300°, LUCIFER represents the ultimate in value.

There's a minimum of 5" of refractory insulation in every model. This is composed for four different types of refractory for greatest protection. Double sealing doors. And the LUCIFER controls are the greatest in the field! Our automatic electronic controls are the simplest, most reliable type. Just dial the desired temperature, throw the switch and your LUCIFER quickly climbs to the desired temperature. Then it stays at that temperature—it can't overheat.

The LUCIFER Electric Furnace is complete—nothing else to buy. Can be in operation within one hour after uncrating!

Write for FREE descriptive literature giving sizes, temperature ranges, K.W. Rating and list of "Blue Chip" users. Prompt attention given all requests for engineering assistance.

2 to 3 weeks delivery!



Model shown—No. 7055-D
18" x 18" x 36" \$1,419.75
F.O.B. Phila. Shipped
from stock

GILBERT S. SIMONSKI CO.
Precision Machine and Tool Work
Route No. 611, Neshaminy, Penna.
Phone Hotboro 0411
Sole Manufacturers
LUCIFER
Electric Furnaces

"Most profitable turning investment we have ever made"

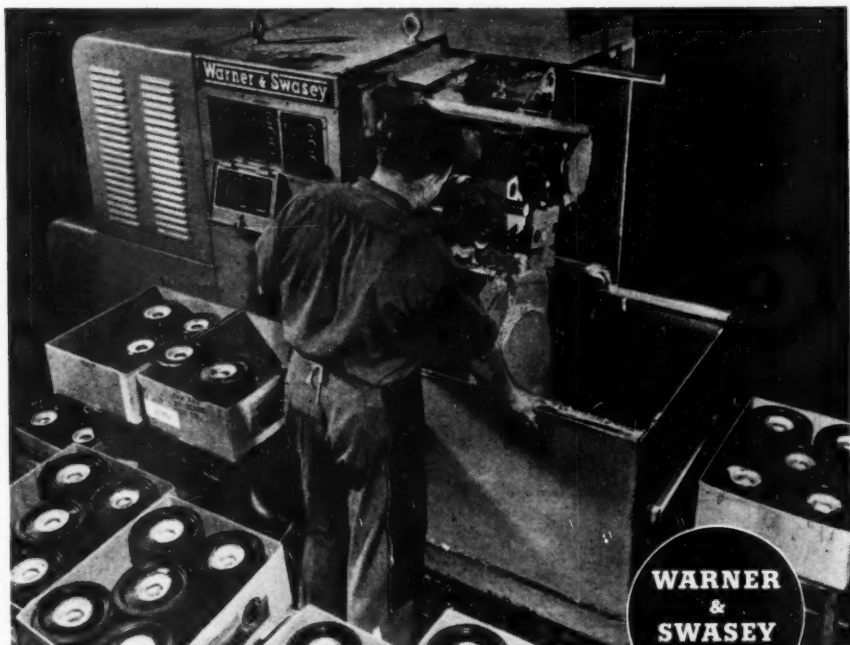
● This is the enthusiastic approval given the Warner & Swasey 1-AC Single Spindle Automatic by H. C. Stebbins, President of Cloyes Gear Works Inc. Timing gear specialists to the automotive industry for 30 years, his 50-man shop was faced with the necessity of expanding operations—without costly building construction—in the face of today's tight manpower situation.

The Warner & Swasey 1-AC answered this complex problem. Using the same floor space, production has been doubled on jobs previously done on hand operated machines. And scarce machine operators have been released for other important jobs in the plant.

Charles Laslo, Plant Superintendent, reports

that he finds the 1-AC adaptable to more and more jobs. And setup is quick—requiring no more time than was necessary for hand operated machines. In fact, it has been found profitable to set up for as few as 100 pieces—most unusual for an automatic machine. The 1-AC's over-all greater accuracy has improved the finished product, and limits of one-thousandth of an inch on bores have been maintained.

So before you make any additional investments in machine tools—or in additional building construction—first call in your nearest Warner & Swasey Field Engineer. He'll show you how Warner & Swasey Automatics can increase production in your existing floor space, and conserve your manpower.



Warner & Swasey 1-AC Single Spindle Automatic in use at Cloyes Gear Works Inc., Cleveland, Ohio

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS AND TAPPING MACHINES



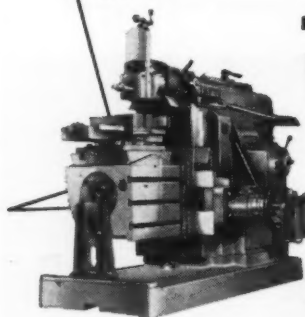
"GET NEW SHAPERS YOU
ARE NOW PAYING FOR THROUGH
COSTLY OBSOLESCENCE..."

INCREASE PRODUCTION
WITH MODERN **GEMCO**

MATCHED-FOR-THE-JOB

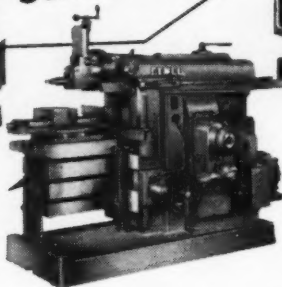
**PRECISION
SHAPERS**

3
MODELS



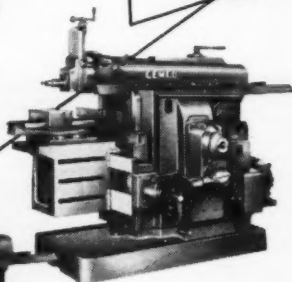
UNIVERSAL

For tool and die work and general machine shop work requiring frequent changes and angular settings. In sizes from 16-in. heavy duty to 36-in. standard duty, with Front Table support. LUBRIGARD protected.



PRODUCTION

For general machine shop use and heavy production work. In sizes from 16-in. heavy duty to 36-in. standard duty and with separate Table and Apron and with Front Table support. LUBRIGARD protected.



PLAIN

For average machine shop use and light production work. Available in sizes from 16-in. heavy through 20-in. heavy duty. Equipped with plain table and with or without Front Table support. LUBRIGARD protected.

WRITE TODAY
FOR BULLETIN
GC 13M



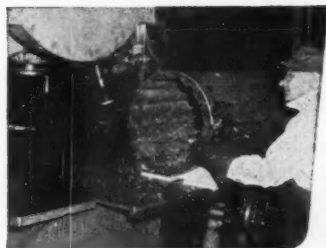
• THEY'RE LUBRIGARD PROTECTED

GENERAL ENGINEERING & MFG. CO.

4417 OLEATHA AVE. • ST. LOUIS 16, MO.
MANUFACTURERS OF PRECISION MACHINERY SINCE 1917

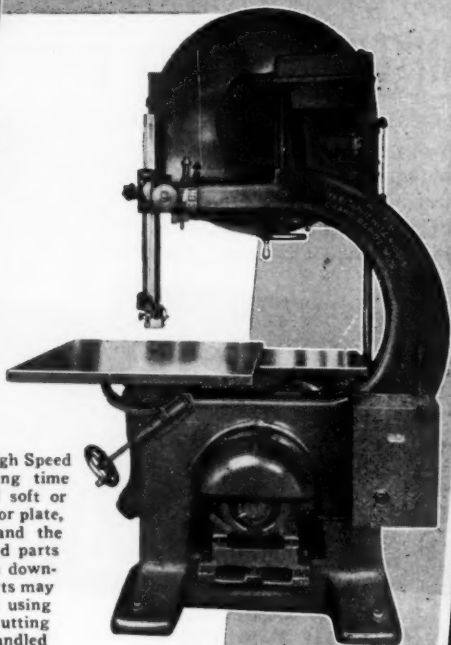


**Cutting Hard-Tempered
1/8" Chrome Moley Steel**



Sawing 16" Steel Piling

Greatest Cost Saver in METAL CUTTING



FRiction sawing with Tannewitz High Speed Band Saws results in perfectly amazing time savings in the cutting of flat sheets of soft or hardened steels, non-ferrous metals, armor plate, glass, plastics, many other materials and the trimming of castings. For cutting formed parts there's nothing to compare with it. The down-drag of the saw is so negligible that parts may be trimmed or sawn as desired without using a rest of any kind. Whatever your cutting requirements, chances are they can be handled faster and at less cost with Tannewitz High Speed Band Saws.

**THE TANNEWITZ WORKS
GRAND RAPIDS, MICHIGAN**



**Write for Your
Free Copy on Friction
Sawing**

**FRICION
SAWING**

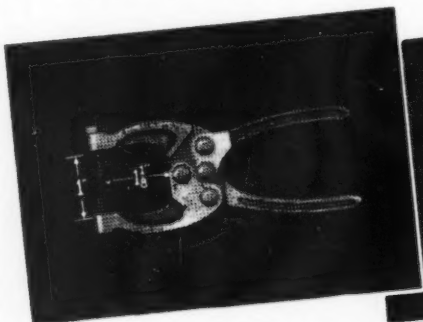
with
Tannewitz
HIGH SPEED BAND SAWS

If you have to

HOLD

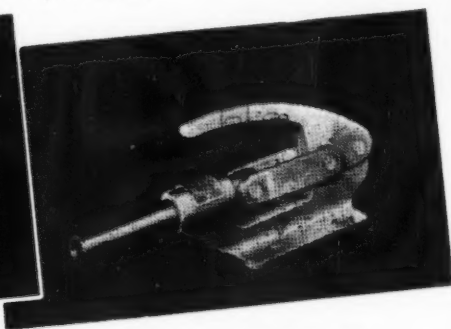
ANYTHING in your production operations

Hold EVERYTHING with "DE-STA-CO" Toggle Clamps in welding, riveting, bonding, machining and assembly. • Fast clamping, positive holding pressures, instantaneous release—Toggle Clamps speed up your operations and cut your costs. • There are more than 40 different Toggle Clamps manufactured by Detroit Stamping Company in various types and sizes to meet industry's requirements.



**MODEL 424
PORTABLE PLIER CLAMP**

For one-hand use in cramped work areas and small space. Deep jaw capacity but only 4½" in length.



**MODEL 650
HEAVY DUTY PLUNGER CLAMP**
For "push-pull" work-holding jobs where considerable pressure is needed. Compact; up to 4000 lbs. capacity.

MODEL 235-U RETRACTABLE CLAMP (Not illustrated)

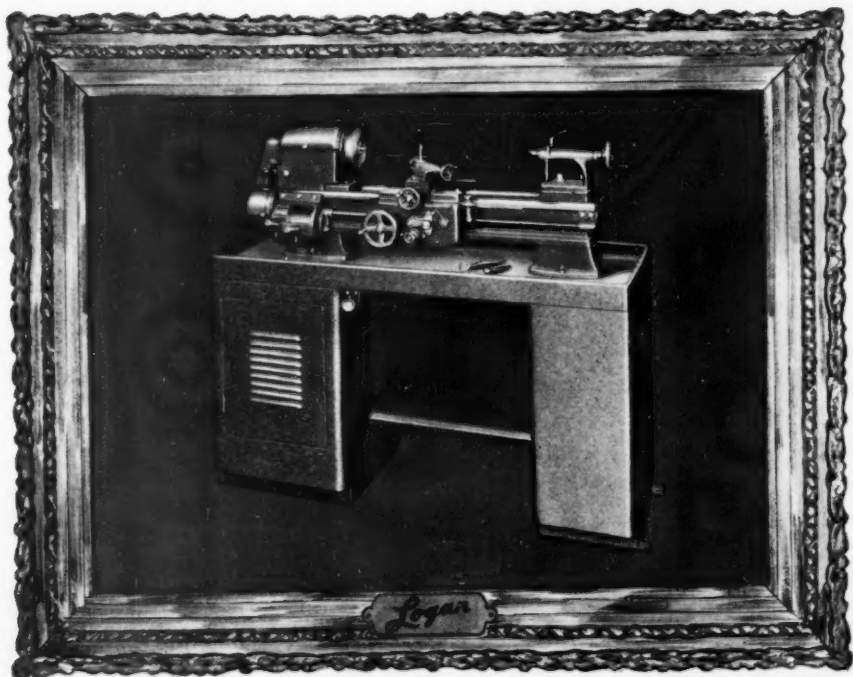
Quick, unimpeded loading and unloading of fixtures easily possible with this one. Up to 750 lbs. pressure.

Ask for "DE-STA-CO" Toggle Clamp Catalog and name of representative nearest you who is stocking our entire line of Toggle Clamps.



DETROIT STAMPING COMPANY

347 MIDLAND AVE. • DETROIT 3, MICH.



RARE PICTURE:

A *Logan* LATHE That's Idle..

Logan No. 955
Quick Change Gear Lathe
11" Swing, 1" Collet Capacity
1 3/4" Spindle Hole

Look down the production lines of metal-working industry, through tool rooms, and large and small machine shops . . . you'll find the work-horse schedules assigned to Logan Lathes.

Logan Lathes keep busy because they do many jobs well. They are quickly and easily set up for any type of lathe operation, a heavy cut, a tool room precision job, a high speed production run, or large volume second operation work. Their sustained accuracy and rugged durability

keep production going at top efficiency. With 11" swing and 1" collet capacity they handle a big percentage of any shop's work. Rugged as well as accurate, they are lathes you can depend on, not only the first year, but for years after. Remember, too, that no other lathe of comparable specifications can match the Logan in economy.

WRITE FOR THE
LOGAN LATHE AND
SHAPER CATALOG



LOOK TO LOGAN FOR BETTER LATHES AND SHAPERS

LOGAN ENGINEERING CO.

4901 West Lawrence Avenue, Chicago 30, Illinois



SPECIAL...

BUT

Also

INTERCHANGEABLE

When you have a special piercing or forming job calling for punches and dies of unusual shapes or alloys, you can save time and money by having R-B make these interchangeable for you. You can use standard or special R-B retainers which eliminate many die design and construction headaches: The R-B ball lock guarantees perfect alignment between punch and mating die, regardless of shape. And, you can replace these special components instantly without die dis-assembly. If you need special punches or dies, why not get in touch with Allied today for the full story on R-B interchangeability. **Allied Products Corporation, Richard Brothers Division:**

CHECK THESE OTHER R-B FEATURES, TOO!

- ✓ Reduce press down-time for replacements
- ✓ Save design and assembly time
- ✓ Fast delivery on wide range of sizes and types
- ✓ Prompt service on "specials"

ALLIED PRODUCTS CORPORATION RICHARD BROTHERS DIVISION

DEPT. 58 • 12621 BURT ROAD • DETROIT 23, MICHIGAN

Please send me your 52-page free catalog.

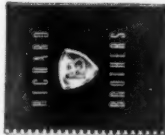
NAME _____ TITLE _____

COMPANY _____

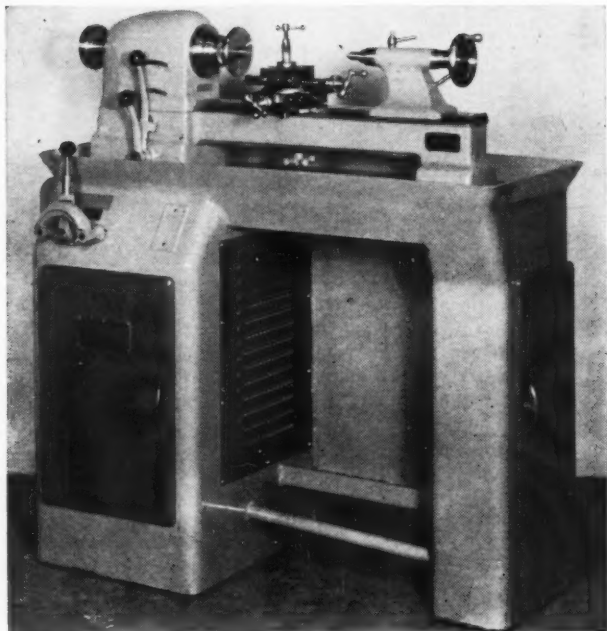
ADDRESS _____

CITY _____ ZONE _____ STATE _____

Also Produced in
ALLIED'S FOUR PLANTS
HARDENED AND PRECISION
GROUND PARTS • STANDARD
CAP SCREWS • SPECIAL COLD
FORGED PARTS • SHEET METAL
DIES • ALLITE DIES CAST OF
ZINC ALLOY • JIGS • FIXTURES



ELGIN Fast Production of Small Parts



- The "Elgin Line" now is furnished with knee-hole bases with foot rests, permitting operator to sit comfortably, close-up and directly in front of work.
- Motor is mounted in base with direct cross ventilation.
- Three shelves are provided on right hand side.
- Collet board is on left hand door, below the convenient centralized controls.
- Variable speed drive provides stepless spindle speeds from 40 to 4000 rpm.

Write for full details.

ELGIN TOOL WORKS

1772 BERTEAU AT RAVENSWOOD AVE. — CHICAGO, ILL.

DO YOU MANUFACTURE PUZZLES?

How many man hours are lost every day in your plant because metal components are not properly marked?

How much time do your customers spend trying to identify parts for re-ordering or replacement?

Are you losing good business because your components are not permanently and legibly marked for instant identification??

Would the use of modern marking equipment save you money?

Simply send prints or samples of parts to be marked, together with exact lettering and its location, for free recommendations.

WRITE FOR CATALOG

MARKING MACHINES — ENGRAVED
STAMPING AND EMBOSSEING DIES —
SPECIAL MARKING TOOLS — NUMBER-
ING HEADS — HAND STAMPS.



**GEO. T. SCHMIDT, INC.**
1802 W. BELLE PLAINE AVENUE
CHICAGO • 13 • ILLINOIS

GAIN THE *Full Benefits of* MAGNETIC CHUCKING



Manual or Motor
Control Models
for 50 to 5000
Watts. Chuck
area 60 to 7500
Sq. In. Special
Models to Suit.



ELECTRO-MATIC RECTIFIERS

Engineered for dependable power conversion for industrial purposes. Most models equipped with automatic electronic Time Delay Switch, adding years to tube life. Quiet and efficient. Fully guaranteed.

Full Particulars Without Obligation

ELECTRO-MATIC PRODUCTS COMPANY
2235 North Knox Avenue
CHICAGO 39, ILLINOIS

NEUTROL

ELECTRO - MAGNETIC CHUCK CONTROLS

Release and demagnetize work pieces simultaneously. No time lost. No damage to work or to chuck faces. Protect chucks from voltage surges. Speed production.



32
MODELS

•
50 to
20,000
Watts

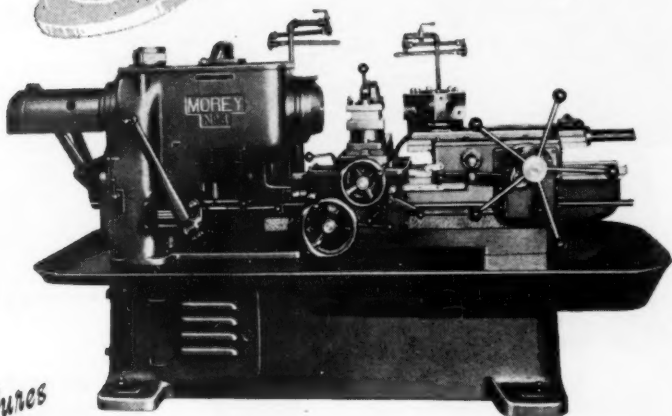


MOREY

TURRET LATHES

No. 2 Plain Type

Nos. 3, 4 and 5 Universal Type



Features

Infinite variable vibrationless spindle speeds.

Remote speed selection control for speed and ease of operation.

The newly designed MOREY TURRET LATHES take advantage of tungsten carbide tools and incorporate all technical improvements in metals, electronics and hydraulics... our design is not hampered by tradition.

Size	Bar Capacity	Swing	Motor
No. 2 Plain.....	1" x 6"	14"	3 HP
No. 3 Universal....	1 1/2" x 10"	16 1/2"	5 HP
No. 4 Universal....	2" x 12"	19 1/2"	7 1/2 HP
No. 5 Universal....	2 1/2" x 14"	21 1/2"	15 HP

FOR BAR and CHUCKING WORK

OBTAIN MAXIMUM PRODUCTION WITH MINIMUM EFFORT FROM MOREY TURRET LATHES . . . INVESTIGATE!



MOREY

MACHINERY CO., INC.

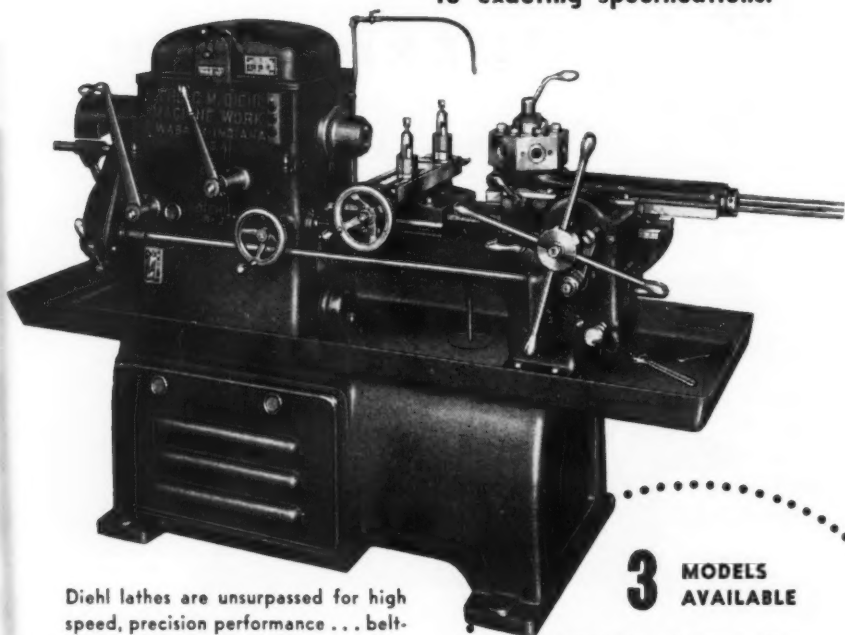
406 BROOME ST., NEW YORK 13, N.Y.

Cable Address: WOODWORK, N. Y.

Telephone: CAnal 6-7400

Diehl ^{NO} 2 TURRET LATHES

assure accurate, smooth cutting
to exacting specifications.



Diehl lathes are unsurpassed for high speed, precision performance . . . belt-driven transmission of power to assure smooth, accurate cutting to rigid specifications. Diehl No. 2 Lathes are standard size and use same tooling, including collets, as other standard No. 2 sizes. They give years of economical, vibration-free service with ample power for extreme production requirements.

3 MODELS AVAILABLE

- Power Feed to Turret—Screw Feed Cross Slide
- Power Feed to Turret—Lever Feed Cross Slide
- Hand Feed to Turret—Lever Feed Cross Slide

Automatic Chuck
Capacity (round)..... 1"
Swing-over cross slide..... 6"
Swing-over bed..... 14"
Six speeds..... forward and reverse

● Write for illustrated literature and specifications.

The G. M. Diehl Machine Works, Inc.

WABASH, INDIANA, U. S. A.

GO DELCO...

give motor trouble the

BRUSH-OFF

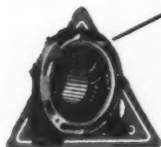
Delco engineering has put a lot of extras into Delco motors . . . and all for one reason: To give you a motor that will drive production machinery longer hours, with less chance of motor breakdown. Look over the rugged motor features below . . . and "go Delco."



WATER-TIGHT CONDUIT BOX
Absolute moisture protection



POSITIVE LUBRICATION
Lengthens bearing life



DELCO COIL INSULATION
Permanently flexible, moisture-proof and wear resistant



POSITIONED BEARINGS
Maintain shaft alignment



DYNAMICALLY-BALANCED ROTOR AND SHAFT ASSEMBLY
Reduces vibration, wear



CORROSIVE-RESISTANT CAST IRON FRAME
More solid, more rugged

"DELCO PREFERRED"

—because Delco Delivers

Open and enclosed motors for most industrial applications in sizes up to 100 horsepower for standard foot mountings. NEMA C&D flange-mounted motors available in sizes through 30 horsepower. Get in touch with Delco Products, Dayton, Ohio . . . or any sales office listed below.



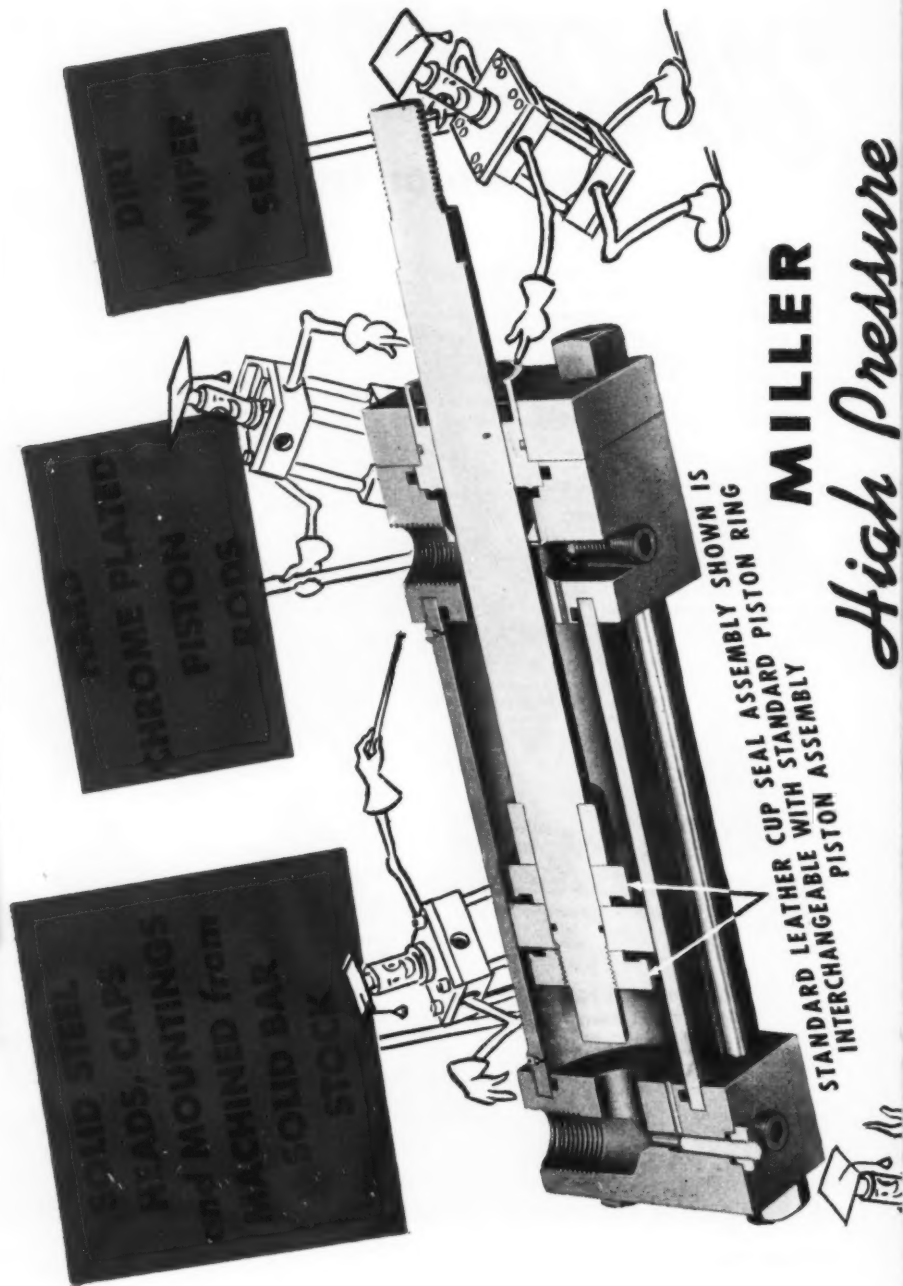
DELCO MOTORS

DELCO PRODUCTS

Division of General Motors Corporation, Dayton, Ohio

SALES OFFICES: Chicago • Cincinnati • Cleveland • Dallas • Detroit • Hartford • Philadelphia • St. Louis

ALSO AVAILABLE THROUGH DELCO MOTOR DISTRIBUTORS



SOLID STEEL
HEADS, CAPS
AND MOUNTINGS
MACHINED FROM
SOLID BAR
STOCK

TUNGSTON
CHROME PLATED
PISTON
RODS

DIRTY
WIPER
SEALS

STANDARD LEATHER CUP SEAL ASSEMBLY SHOWN IS
INTERCHANGEABLE WITH STANDARD PISTON RING
ASSEMBLY

MILLER
High Pressure



HYDRAULIC CYLINDERS

Meet J. I. C. HYDRAULIC STANDARDS

(Write for FREE Copy of these "Standards")

Years before the Joint Industry Conference (J. I. C.) Standards for specifying "quality" hydraulic equipment were adopted, the *standard* design and construction features of Miller High Pressure Hydraulic (2000-3500 psi) Cylinders already included ALL the specifications for cylinders, seals and pistons now called for by the "Standards". Hard chrome plated, scratch-resistant piston rods and dirt wipers have long been standard Miller cylinder features yet are required by the "Standards" only under severe conditions.

Solid steel heads, caps and mountings which eliminate costly, dangerous breakage even under the severest operating conditions represent an "extra-quality" standard Miller cylinder feature which actually exceeds the high quality set by the J. I. C. Standards.

The Miller "Patented" Hydraulic Piston Rod Seal which has no manual adjustment and is automatically self-adjusting and wear-compensating to give life-long leakproof service without ever requiring any manual adjustment whatsoever . . . far surpasses the requirement of J. I. C. Standard H6.2.5 which specifies "Stuffing boxes for automatic packing shall be so designed as to prevent adjustment beyond the functional limits of the packing"

Write for illustrated cylinder bulletins A-105 and H-104

COMPLETE MILLER CYLINDER LINE INCLUDES: AIR CYLINDERS, 1½" to 20" BORES, 200 PSI OPERATION; LOW PRESSURE HYDRAULIC CYLINDERS, 1½" to 6" BORES FOR 500 PSI OPERATION, 8" to 14" BORES FOR 250 PSI, HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" to 12" BORES, 2000-3000 PSI OPERATION, ALL MOUNTING STYLES AVAILABLE.



MILLER MOTOR COMPANY

2026 N. HAWTHORNE

MELROSE PARK, ILLINOIS

AIR AND HYDRAULIC CYLINDERS • ACCUMULATORS • COMPENSATORS • CYLINDER ROD SEALS

CLEVELAND — PITTSBURGH — PHILADELPHIA — DETROIT — YOUNGSTOWN — BOSTON
HARTFORD — NEW YORK CITY — DAYTON — ST. PAUL — FORT WAYNE — INDIANAPOLIS
MILWAUKEE — NASHVILLE — SEATTLE — LOS ANGELES — SAN FRANCISCO — BALTIMORE
ST. LOUIS AND OTHER AREAS.

Sales and Service from coast to coast

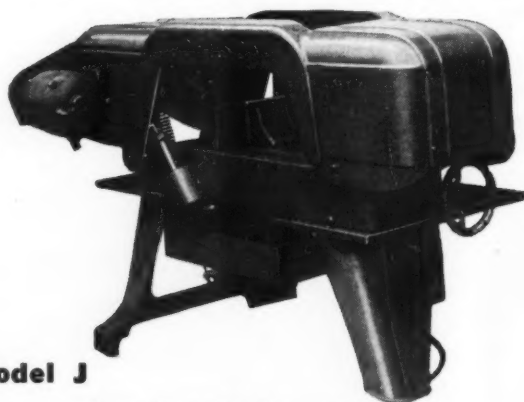
It's Made Right!

**CONSTANT
DEPENDABLE
SERVICE**

**Because—We use
only known high
standard parts,
coupled with
close-tolerance
machining.**

JOHNSON ★
Metal Cut-Off BAND SAWS

lead the way in the metal-cutting field. They last indefinitely and deliver the most in time-saving accuracy and efficiency. They are adaptable to any cutting job. Quick change from light to heavy stock requires only a minute. Model J, pictured capacity, 10" rounds, 18" flats. Smaller lighter Model B, capacity 5" rounds, 10" flats.



Model J

There is a Dealer near you.

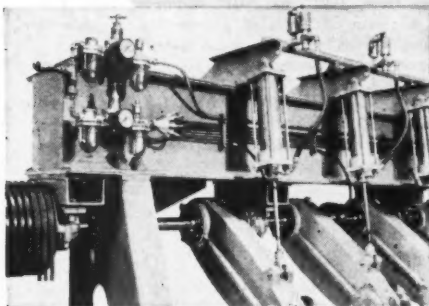
JOHNSON MANUFACTURING CORP.
ALBION, MICHIGAN

Norgren MICRO-FOG

Lubricates Bearings & Drives on 24-ft. assembly of 13 saw ladders

**Results after gruelling
saw mill service:**

1. Bearings in excellent condition.
2. Chain drives and sprockets show no sign of excessive wear.
3. NO ACCUMULATION OF OIL IN HOUSINGS



● **The PORTLAND OVERHEAD TRIMMER**, product of Portland Iron Works, Portland, Ore., manifolds an oil-fog to 13 saw ladders over distances up to 24 feet.

The problem was to assure uniform lubrication of each of the 13 saw ladder units that extended over a distance of 24 feet—without leaving pools of oil in the bottom of ladder housings.

The Portland Iron Works experimented at length with various airline lubricators—and found that Norgren Micro-Fog Lubricators assured faultless lubrication at all vital points. Note the two Norgren Lubro-Control Units which filter, regulate, and lubricate air to the 13 saw complements.

If you need closely controlled lubrication traveled over long distances to single or multiple air-actuated devices—CHECK ON THE NORGREN MICRO-FOG LUBRICATOR.

**25th Year of
Progress**

For complete details,
write for
APPLICATION DATA SHEETS No. 109,
C. A. Norgren Co., 238 Santa Fe Drive,
Denver 9, Colo.

Norgren



Lubricators, Regulators, Filters,
Relief Valves, Check Valves,
Air Governors, Needle Valves,
Hose Assemblies and Couplings.

25 YEARS OF HELPING AIR POWER SERVE INDUSTRY BETTER

Van Keuren WIRE TYPE PLUG GAGES



VAN KEUREN FULL 2" GAGE



AGD 1 1/4" GAGE

WHICH GAGE WILL YOU BUY?



CATALOG AND HANDBOOK No. 34

This 208 page volume represents 2 years of research sponsored by the Van Keuren Co.

It presents for the first time in history a simple and exact method of measuring screws and worms with wires.

It tells how to measure gears, splines and involute serrations. It is an accepted reference book for measuring problems and methods.

Copies are now free upon request.

Wire Type Plug Gages were originated by The Van Keuren Co. over 25 years ago. In 1948 this design was adopted in shorter lengths as the AGD standard for gaging holes from .030" to .510" diameter. The Van Keuren Co., because of years of pioneering, is able to offer the extra length at little or no extra cost.

You cannot afford to lose this extra length. When you need plug gages obtain a quotation from The Van Keuren Co. — Compare **COST PER HOLE GAGED**. You can be assured of quality and accuracy. A double inspection at the factory eliminates your inspection expense. No time will be lost waiting for replacements. You can count on prompt delivery from a stock of 2 million wires. Specify Van Keuren wire type gages and get the most **GAGE for your GAGE DOLLAR**.

Send for Supplement 19 showing quick and easy method of getting 4 to 10 gages from 1 VK wire type gage unit

Available in
TOOL STEEL HIGH SPEED
CHROMIUM PLATE VK CARBOLOY

FOR SUPERSERVICE Phone Watertown 4-4394

THE *Van Keuren* CO.

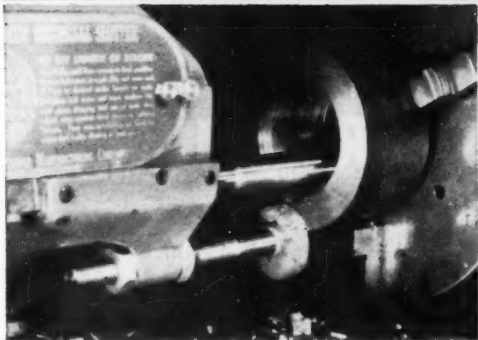
32nd YEAR

177 WALLHAM STREET, WATERTOWN, MASS.

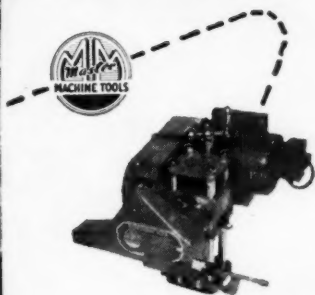
Light Wave Equipment • Light Wave Micrometers • Gage Blocks •
Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires •
Thread Measuring Wires • Gear Measuring System • Shop Tools •
Gages • Carbide Plug Gages • Carbide Measuring Wires

**more
OPERATIONS**

ON YOUR LATHE, TURRET, OR MILL
with
**MASTER MACHINE TOOL
ATTACHMENTS**



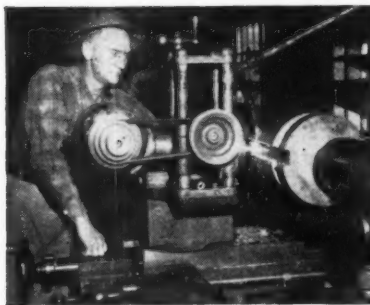
INTERNAL KEYWAY CUTTING WITH
MASTER SLOTTING HEAD ON A LATHE



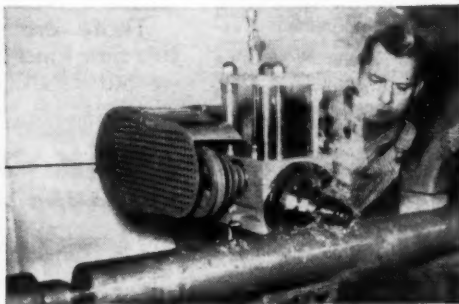
*Master Universal
Slotting and Keyseating Head*

The multi-purpose Master milling, grinding and keyseating attachments increase the facilities and capacity of your lathes, turrets, or mills, in maintenance shops, tool rooms, as well as production shops. For the cost of one single-purpose machine, you can have several Master units producing on your present equipment.

THREE SIZES: Model "C," $\frac{1}{2}$ h. p. for 9" to 13"; Model "B," $\frac{1}{2}$ or $\frac{3}{4}$ h. p. for 13" to 18"; Model "M," 1 or $1\frac{1}{2}$ h. p. for 18" to 72" swing lathes.



END MILLING $2\frac{1}{2}$ " KEYWAY IN $9\frac{7}{8}$ "
SHAFT 22 FT. LONG



$1\frac{1}{2}$ H.P. MODEL "M" ON LATHE MILL-
ING $\frac{1}{2}$ " KEYWAY 1 FT. PER MINUTE

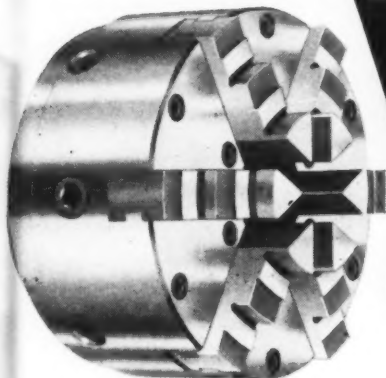
WRITE FOR TWENTY-FOUR PAGE CATALOG

MASTER MANUFACTURING CO.
1310 EAST AVENUE A ■ HUTCHINSON, KANSAS, U. S. A.

Buck

ADJUST-
TRUE

CHUCKS



.0005 PRECISION

In 1 MINUTE

Fastest chuck in the world!

Saves fooling around adjusting

the grip of four jaws . . . cellophane shims . . . "springing". Keeps the same .0005" precision chucking duplicate parts **with scroll chuck speed.**

NOTHING LIKE IT!

This is the first and only successful dual control chuck. Its operation is easy to understand and use. One pinion (see center of chuck body above) moves jaws in or out to grip work — just like any scroll chuck. 4 opposed screws (only two can be seen in photo) work on the chuck adapter to bring work to dead center. Even dubs have centered work within .0005" in 3 minutes. Once set dead true, hundreds of duplicate parts can be machined without changing adjustment — by simply using the scroll control.

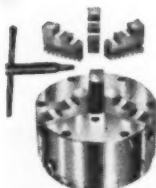
6" 6-jaw Buck **handles the work of 93 collets** — yet it's priced in line with ordinary chucks!

Those are just some of the features of this new kind of chuck. They are unbelievable — but TRUE! Send for literature — see for yourself.

BUCK TOOL COMPANY

1112 Schippers Lane

Kalamazoo, Mich



**3 STEP-JAW
CHUCK**

4 sizes—
4"—light duty
5", 6", 7½"—
—heavy duty



**6 STEP-JAW
COLLET CHUCK**

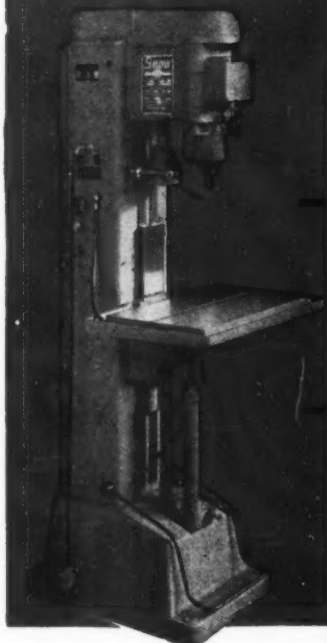
4 sizes—
4"—light duty
5", 6", 7½"—
—heavy duty



**6 JAW
PRODUCTION
COLLET CHUCK**

4 sizes—
4"—light duty
5", 6", 7½"—
—heavy duty

*For Top
Production*



Snow air operated—electrically controlled machines have built in full universal controls that allow selection of the type of spindle cycle desired. This feature also permits instant synchronization of the standard Snow Master Fixtures. All types of air operated automatic and semi-automatic jigs and fixtures are carried in stock. Standardization permits low cost tooling—and—high production. Sensitivity of power application prevents tool breakage.

Simplicity of control means that set up and operation can be handled by a less experienced operator with minimum fatigue.

Submit Sample Parts for

SNOW

FULL UNIVERSAL MACHINES

Air operated, electrically controlled Snow tools are establishing amazing production records daily on a wide variety of work. Just note these typical examples:

DRILLING

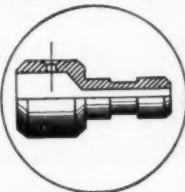
Crossdrill and C" T" Sink 1/16" Hole

Material—Brass

Production—4800 per hour

Fixture—#15 Vertical index

Equipment—#1-UD Drilling Machine



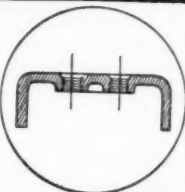
TAPPING

Tap Two #10-32 Holes

Material—Steel stamping
Production—3800 tapped holes
per hour

Fixture—#14 horizontal index

Equipment—#1-UT tapping machine



THREADING

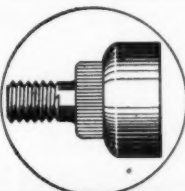
3/8"—24 Thread—1/2" Long

Material—Die Cast Aluminum

Production—2500 per hour

Fixture—#10 Drum dial

Equipment—#3-TR Threading machine



SNOW

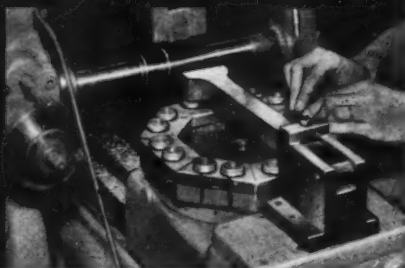
MANUFACTURING COMPANY

435 Eastern Ave., Bellwood, Illinois
(Chicago Suburb)

Single Spindle Verticals • Two-Spindle Verticals • Two-Spindle Horizontals • Automatic Nut Tapping Machines • Drill Press Tap Heads • Automatic & Semi-Automatic Jigs & Fixtures

Want More Milling Production?

...Simply Add a
SUNDSTRAND
Automatic
Index Base



Many methods engineers have found the Sundstrand Automatic Index Base a simple solution to increasing production. Its application to milling, boring and drilling jobs also improves accuracy and invariably makes it easier for the operator to produce more pieces per hour. Increased production and improved accuracy are both obtained while eliminating operator fatigue.

Accurate Spacing, Powerful Clamping Insures

Accuracy Unlike many conventional index bases, the Sundstrand Automatic Index Base is designed so there is no strain against the index plunger during the cut. The base is locked securely during cut by powerful clamping action applied radially. Strain against the index plunger and master plate is relieved when the base is in locked position so that accuracy of index is not affected by heavy cuts.

800 Pieces Milled Per Hr.

Here's just one of the many typical, profitable installations of Sundstrand Automatic Index Bases. As illustrated above, this 8 station index base eliminates "down-time" on a slotting operation. Operator merely loads and unloads part during automatic cycling of machine. At each station two parts are held by an automatically operated clamp. Higher production figures like this are commonplace with the Sundstrand Automatic Index Base. It will work equally well for you.

Clamping for the cut, unclamping after the cut, indexing to each station, and stop at the completion of the desired number of indexes is all automatically controlled by limit switches. These are operated by a moving member of the machine such as a milling machine table. Thus, the operator's duties are greatly simplified permitting him to run several machines depending on operation and number of indexes.

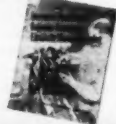


Sundstrand
Automatic Index Base

Get Complete Data

FREE

Ask for bulletin 413.



SUNDSTRAND MACHINE TOOL CO.

2535 ELEVENTH ST. ROCKFORD, ILLINOIS, U.S.A.

SPEEDS UP OPERATIONS IN TOOL ROOMS
... ON PRODUCTION LINES

DREMEL - *Electric* MOTO-TOOLS



DOES THESE
OPERATIONS
BETTER—
FASTER:

GRINDING
DRILLING
BURNING
POLISHING
DRESSING
SHARPENING
ENGRAVING
FINISHING

WRITE
FOR
INDUSTRIAL
CATALOG



"THE POCKET-SIZE MACHINE SHOP"

Dremel Moto-Tools are time tested—have been widely used in industry for over fifteen years. A veteran of World War II, Moto-Tool served in war plants and at military maintenance bases throughout the world. Thousands of these mighty midgets helped to make the atomic bomb—were used to establish production records in defense industries during the last war. Hundreds of toolroom and production line operations, such as polishing and grinding dies, burring parts, marking tools, sharpening cutters, touch up jobs, etc. are accomplished in seconds, without tearing down "set-ups." Moto-Tool is sturdily constructed for long lasting industrial service. Weighs only 13 oz.—dynamically balanced for vibration-less operation.

APPROX.
27,000
R.P.M.

MOTO-TOOL KIT NO. 2 contains 23 accessories, including high-speed steel cutters and Model 2 Moto-Tool in natural finish hardwood case\$23.50

MOTO-TOOL No. 2, with one emery wheel point\$16.50

Dremel HIGH-SPEED STEEL CUTTERS and balanced wheel points are available for all makes of hand grinding tools. Write for literature.



DREMEL MFG. CO. Dept. 211-L **RACINE, WIS. U.S.A.**

**EVERY SHOP NEEDS
THIS TOOL OF A
HUNDRED USES . . .**



CLECO
B-1 PNEUMATIC
**SCALING
TOOL**

Swivel control valve prevents twisting of air hose

Air admitted by hand pressure on tool

Adjustable throttle valve controls power

Steady jet of exhaust air removes chips

Positive and sturdy chisel retainer

for

Removal of weld splatter

Rust and paint scrapings

Cleaning sand from
small castings

General scaling, beading
and peining



Write for Bulletin 84



CLECO DIVISION

of the REED ROLLER BIT COMPANY

5125 Clinton Drive

Houston 20, Texas

2829

**Faster production
at lower cost**

**MODERN
COLLAPSIBLE
TAPS**

new



**FOR EITHER
STATIONARY OR
ROTARY USE**

**Modern Precision Tools
Include**

**STATIONARY SELF-OPENING
DIE HEADS**

**ROTARY SELF-OPENING
DIE HEADS**

**STATIONARY
COLLAPSIBLE TAPS**

**ROTARY
COLLAPSIBLE TAPS**

**MODERN-MAGIC
CHUCKS AND COLLETS**

**SELF-OPENING
STUD SETTERS**

**INSERTED BLADE
FACE MILLING CUTTERS**

**SOLID ADJUSTABLE
DIE HEADS**

**ADJUSTABLE HOLLOW
MILLING TOOLS**

**UNIVERSAL CHASER
GRINDING FIXTURES**

- Easy and quick adjustment. No special tools required.
- Interchangeable shank for convenience in changing from one machine to another.
- Thread length setting undisturbed by diametrical adjustment.
- Extra rigidity with unusually sensitive collapse.
- Simple in design. No complicated mechanisms.
- Heavy chasers for greater strength. Chaser threads precision ground.
- All parts hardened and ground and precision fitted.

Send for full information on this new improved Modern Collapsible Tap and its cost reducing possibilities applicable to your tapping

MODERN TOOL WORKS

**DIVISION OF
CONSOLIDATED MACHINE TOOL CORPORATION
ROCHESTER 10, NEW YORK**

You can cut
**ANY MACHINABLE
MATERIAL**

from wood to hard
steel with these
rugged, gang-cutting
hole saws

**40
SIZES**
from $\frac{1}{8}$ "
to $4\frac{1}{2}$ "

Cut big holes
faster and cheaper
with new, high-speed

BLU-MOL[®]

HOLE SAWS

**NEW
FOLLOW-THROUGH
TYPE**

Ideal for stacked
material or
cutting through
partitions

**WRITE FOR
FULL DETAILS**

— or let us arrange for a
demonstration. See for yourself
how these new, ultra high-speed
"Blu-Mol" Hole Saws can save
you time and money on many
maintenance and production
operations.

Millers Falls Company
Greenfield, Mass.

Super high-speed

**WELDED
EDGE**

on extra tough
alloy steel
back

Cut up to
 $1\frac{1}{8}$ "

DEPTH
in solid
material

**MILLERS FALLS
TOOLS**

SINCE
1868

The Mark of Superiority

"Blu-Mol" Hole Saws are
part of the world's broadest
and most highly developed
line of metalcutting saws.

MACHINE and TOOL BLUE BOOK

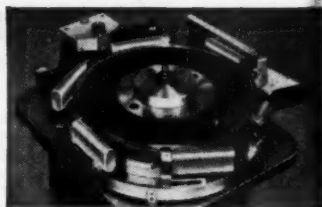
PERMANENT MARKING

*at higher
production speeds*

Noblewest marking machines and methods have been developed to meet industry's demand for constantly higher marking speeds at lowest possible cost per unit marked. When you mark your products with the new Noblewest equipment, they are *permanently marked* — faster, better, and at lower cost. The inscriptions — large or small — are rolled in — last as long as the product itself. It will pay you, as it has hundreds of leading manufacturers, to put your marking problems up to Noble & Westbrook Mfg. Co., 9 Westbrook St., East Hartford 8, Conn.



Insert shows Model 157 tooled for marking General Electric metal capacitors at speeds of 60 to 70 per minute.



Write for catalog "Modern Marking Methods."

MARK IT
BEST WITH

NOBLEWEST
IMPROVED
MARKING
DEVICES

NOBLEWEST



on these
nationally famous
STANDARD GRINDERS

FULFLO COOLANT PUMPS provide a copious coolant
supply - constantly, uniformly - with
absolutely NO SPRAY OR SPLASH.

Ask us how FULFLO COOLANT PUMPS can
increase efficiency on your equipment.

THE



Write on your letterhead for
FULFLO MECHANICAL DATA BOOK

Specialties Co., Inc.
BLANCHESTER, OHIO

***Want more
output?***



GET MORE POWER PER POUND WITH THE NEW 360 CYCLE TOOLS

Rotor's new line of 360 Cycle Tools gives you:

More power, less weight . . . nearly twice the power of 180 cycle tools with the same size of motor . . . more than four times the power of universal electric tools per pound of weight.

High speed under load . . . Rotor 360 Cycle Tools slow down only about 5% under full load, compared to 20% for pneumatic tools and 45% for universal tools.

Result: Lower costs through increased production. Ask the Rotor Analyst to explain how the New Rotor 360 Cycle Tools also mean *lower installation cost and lower power cost.*

Write for a free copy of Bulletin 36 describing this new Rotor line of grinders, sanders, buffers and polishers.

360 CYCLE O'TOOL

AIR

THE **ROTOR TOOL** CO.

CLEVELAND, OHIO

HIGH
CYCLE



SIMONDS
ABRASIVE CO.
Grinding Wheels

ALL'S HARMONY in the grinding department

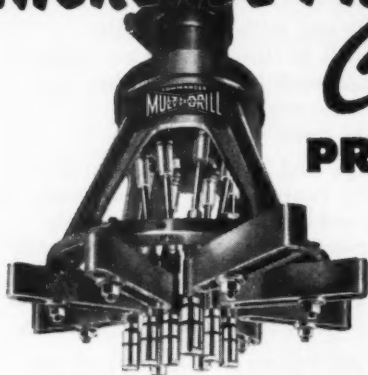
For better output, these boys know the score. It's Simonds Abrasive Company grinding wheels for the stepped-up tempo of defense requirements. Simonds complete line has everything to keep *your* production in tune with today's needs . . . grinding wheels for every operation, mounted wheels and points, segments and abrasive grain . . . top quality products backed by Simonds Abrasive Company's reputation as a major grinding wheel manufacturer for almost 60 years. Write for free grinding data book listing name of your Simonds distributor.



SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

INCREASE PRODUCTION with *Commander* PRODUCTION TOOLS



You can drill 2 to 8 holes at one stroke of a MULTI-DRILL equipped drill press. Instantly and easily adjusted to any hole pattern . . . compact in design and ruggedly built for years

Adjustable MULTI-DRILL

- ★ DRILLS UP TO 8 HOLES AT 1 STROKE
- ★ ADJUSTABLE TO ANY HOLE PATTERN
- ★ FITS ANY DRILL PRESS

of service, thousands of MULTI-DRILLS are cutting costs and increasing output up to 800% wherever metal, wood or plastics are drilled.

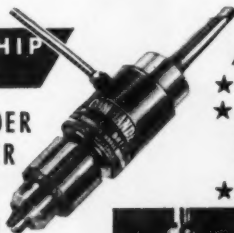
New DRILL CHIP BREAKER

Get these COMMANDER DRILL CHIP BREAKER

benefits now:

- Faster Drilling
- Deeper Holes
- Better Holes
- Longer Drill Life
- Safer, Cleaner Work
- **REDUCED DRILLING COSTS**

Write for illustrated Circulars on Commander Production Tools. See us at Booth A-159 National Metal Show, Detroit, October 15th to 19th.



ORDINARY CHIPS



CHIP BREAKER CHIPS

COMMANDER TAPPER

- ★ 1 Tapper Handles Taps #0 to 3/4"
- ★ Automatically Sensitive...
- Any Operator Can Do Precision Tapping
- ★ Fits ANY Drill Press



Commander Tappers "think for the operator"—automatically stop when taps are dull, overloaded, or when they strike bottom in blind hole tapping—permit faster tapping, better work, even with inexperienced operators. Torque control provides positive tap protection from #0 to 3/4" . . . spring clutch eliminates slippage, assures smooth, quiet, easy operation.

Commander MANUFACTURING CO.

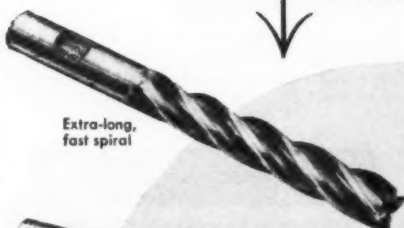
4227 W. KINZIE ST. • CHICAGO 24, ILL.

End Mills that Save Down-Time

Precision-made end mills that meet the highest standards of cutter design cut faster, more freely, and with less power. They turn out more work between sharpenings — reduce machine down time.

Brown & Sharpe End Mills are made under exacting quality control, from start to finish. Steel formula and heat treatment are closely held to rigid specifications. Careful machining maintains consistent adherence to design standards. Write for complete catalog. Brown & Sharpe Mfg. Co., Providence 1, R. I., U.S.A.

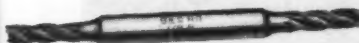
WE URGE BUYING THROUGH THE DISTRIBUTOR



Extra-long,
fast spiral



Long,
two-flute,
fast spiral



Fast spiral,
double end



Ball end,
two-flute
fast spiral



Brown & Sharpe



Waldes Internal Grooving Tool

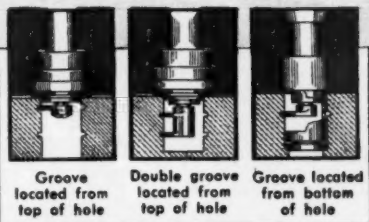
for precision cutting of internal grooves
in bores and housings

FAST! ECONOMICAL! NEEDS NO SKILLED LABOR!



Internal groove-cutting becomes the simplest of operations with Waldes Internal Grooving Tool. Easy to adjust—easy to operate...readily adaptable to individual requirements.

Designed for use in any hand drill or automatic drill press and screw machine... assures a concentric recess without injury to metal. Operates by fingertip pressure—especially suitable for unskilled operators.



The Waldes Grooving Tool when used in an electric or pneumatic hand drill, can be taken to the job eliminating disassembly and excessive handling...resulting in all-around savings in time and costs!



WALDES
TRUARC

RETAINING RINGS

WALDES KOHNOOR, INC., 47-16 Austel Place, Long Island City 1, N.Y.

WALDES TRUARC RETAINING RINGS ARE PROTECTED BY THE FOLLOWING PATENT NUMBERS: U. S. PAT. 2,392,940; 2,420,921; 2,411,781; 2,407,803; 2,407,802; 2,401,306 AND OTHER PATS. PEND.

Write now for descriptive brochure giving mechanical details,
cutting sizes...extra features

Waldes Kohnoor, Inc., 47-16 Austel Place
Long Island City 1, New York

Please send me your descriptive brochure on
Waldes Internal Grooving Tool.

Name

Title

Company

Business Address

City Zone State



METAL CUTTING
BAND SAWS

Regular—Skip Tooth
Spring Temper

SOLID TOOTH SAWS

INSERTED
TOOTH
SAWS

SEGMENTAL
TYPE SAWS

All 3 Types of Saws
Also Furnished with Carbide Tips

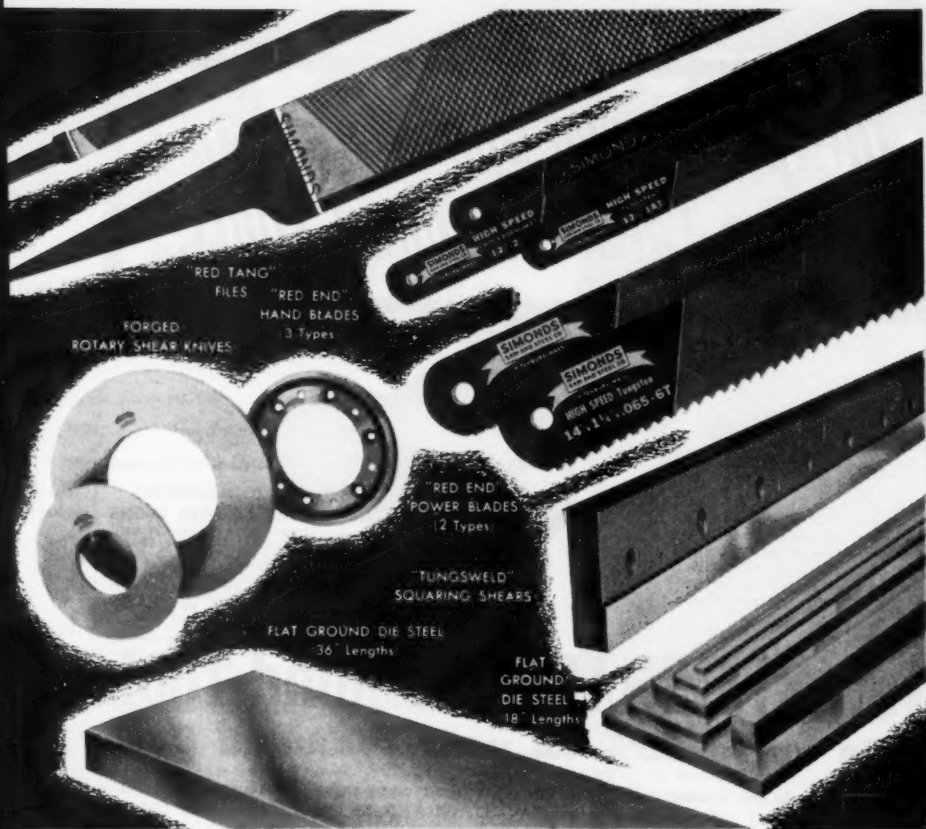
**If You Cut Metal
CUT MORE
with
SIMONDS
Industrial Line**

Over 100 years devoted to the ideal of developing the foremost line of cutting tools in this country ... that's what underwrites every purchase you make of any product in the Simonds Line.

And don't forget this: You get 100% Simonds Quality Control ... beginning with steels processed for your job from Simonds own steel mills ... and going all the way through Simonds famous Windowless Plant (first in this country).

Here, in this completely controlled-conditions plant, modern straight-line production methods are

The Simonds Line is



implemented by special equipment to produce cutting tools of one quality only... Simonds TOP Quality.

And you can bank on it that these Simonds Tools will deliver top performance on *any* job... from hand filing and hacksawing, to production machine cutting with saws of all types and sizes. So, if low-cost and high-level production are vital to you... then specify "Simonds" to your distributor or dealer on any requirement you may have on which the tools shown above will serve.

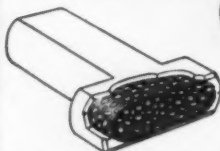
Remember: You start to save, the minute you say SIMONDS!

SIMONDS
SAW AND STEEL CO.

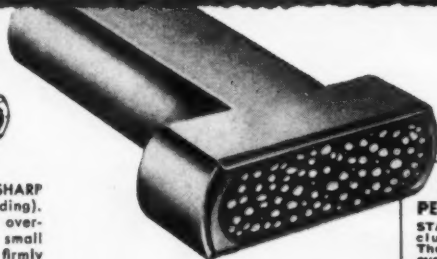
Branch Offices in Boston, Chicago, San Francisco and
Portland, Ore. Canadian Factory in Montreal, Que.

the Production Line

Inexperienced Operators Can't Abuse These Diamond Tools!



Enlarged view shows STA-SHARP Diamond Tool (Patent pending). Phantom view above shows overlapping layers of selected small SOLID diamonds which are firmly locked in place in a special matrix by exclusive bonding process.



70 DIAMONDS PER SQUARE INCH!

STA-SHARP tools are NOT cluster diamond tools. They are made with many overlapping layers of fine quality, natural small diamonds. The cutting face of each STA-SHARP presents not less than 70 solid diamonds per square inch.

New STA-SHARP Diamond Tools **Save up to 50% on your Diamond Costs**

STA-SHARP tools are abuse-proof! Even the most inexperienced operator can't wreck these diamond tools by carelessness or incorrect use. The diamonds in these tools do not get dull. These must not be turned, require no supervision. They always do a good trueing and dressing job until completely used up.

With the exclusive STA-SHARP design, as the top layer of diamonds wears down, the next overlapping layer comes into cutting position. While passing across the face of the wheel, as the forward diamonds wear down, the following diamonds maintain gage and give a true concentric and parallel wheel. This eliminates fading. STA-SHARP tools are not reset because they stay sharp to the very end.

Leading companies who have changed to STA-SHARP for their Centerless Grinders report savings up to 50% on their diamond costs.

Send for Circular

Mail coupon for special circular giving full details and prices on STA-SHARP Diamond Tools — also Catalog of complete line of Golconda Diamond Tools for every purpose.



GOLCONDA CORPORATION
(A Division of Super-Cut, Inc.)
3220 North Knox Ave.
Chicago 41, Illinois

Gentlemen: Please send me special circular of STA-SHARP diamond tools and complete catalog of Golconda Diamond tools.

Name _____
Address _____
City _____ Zone _____ State _____
Firm Name _____

Golconda Corporation

(Division of Super-Cut, Inc.)

3220 North Knox Avenue
Chicago 41, Illinois

A New Machining Method *Saves* **4.07 HOURS** **ON EACH 100 PIECES**

PORTER-CABLE ABRASIVE-BELT MACHINING

The Piece: Aluminum base plate for electric saw.

The Job: To grind a 45° bevel on one edge.

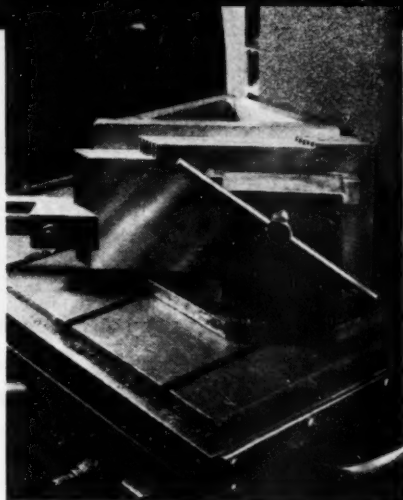
Previous Method: Plates beveled one at a time on milling machine. Production: 4.54 hrs. per 100 pieces.

Present Method: Work placed on Porter-Cable Wet-Dry Belt Grinder with Automatic Feed Table, Model BG8 — FT9. Simple fixture with one holding clamp holds six pieces. An 80 grit silicon carbide belt is used wet.

Result: Loading and unloading time cut 83%. Production: .47 hrs. per 100 pieces — a saving of 4.07 hrs. Extra bonus: 89¢ of each dollar spent on milling is saved!

Porter-Cable's BG8 Wet-Dry Belt Grinder often greatly steps up output of work now being milled, shaped, planed or wheel ground. Uses simpler fixtures . . . provides quicker set-ups — holds close dimensional limits. Large surfaces, especially those having a dispersed pattern of bosses, completed by one presentation to belt.

*Send for free booklet — shows how Abrasive-Belt Machining speeds production.
Reduces costs on many operations.*



Abrasive Belt Machines for Every Application



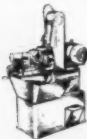
Platen
Grinders



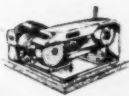
Contour
Grinders



Flexible Belt
Grinders



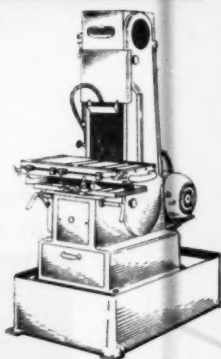
Centerless
Grinders



Bench
Grinders



Contact Wheel
Grinders



Model BG8-FT9
(with Automatic
Feed Table)

PORTER-CABLE MACHINE COMPANY
4011 N. Salina St., Syracuse 8, N. Y.

Please send me your free booklet: "Abrasive-Belt Machining."

Name

Address

City

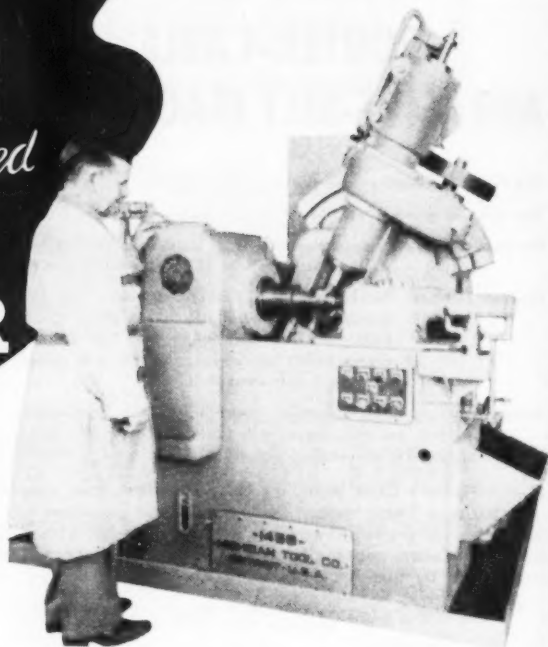
State

**Manufacturers of
SPEEDMATIC and GUILD
Electric Tools**

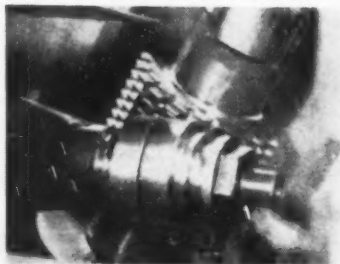
In Canada Write: Strongridge Ltd.
St. Catharines, Ont.

Announcing the new

MICHIGAN
*High Production
High Speed*
**GEAR
HOBBER**

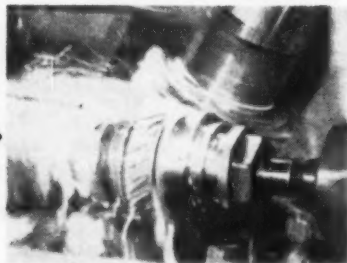


READY TO HOB TWO 3 1/8" GEARS



Just before button is pushed
to start the cycle.

15 SECONDS LATER



Hob has completed its plunge cut
and transverse feed of work starts.

Rounding out its complete line of gear production machines and tools, Michigan Tool is proud to announce successful completion of development and production testing of its spectacular new high-speed, high-production, single-spindle gear hobber—designed to make tomorrow's gear hobber requirements available today.

It employs a number of new design and operating principles developed and proven over a period of several years, all of which combine to give the Michigan Gear Hobber output rates which closely approach those of Michigan Underpass gear finishers and "Shear Speed" gear shapers.

For example, the Michigan Gear Hobber can finish-cut two 3 1/4" diam. 9 pitch, (2 inch total face width) gears simultaneously to well within pre-shave tolerances, in a matter of 58 seconds, using high speed steel hobs.

For details, write for
Announcement Bulletin No. 1458A.



MICHIGAN TOOL
Company



7171 E. McNICHOLS RD. • DETROIT 12, MICHIGAN, U. S. A.

•
Enables use of HSS hobs at practically
'carbide' speeds.

•
Hob speeds up to 1000 rpm or more available, if ever needed. (i. e., 1300 SFPM or more with a 5" hob)

•
Infinitely variable feeds at touch of a dial.

•
Gear accuracy virtually independent of machine operation.

•
Positive hydraulic dual feeds eliminate 2/3 of gears otherwise required.

•
Plunge feed replaces conventional approach feed; gives shorter total hob travel.

•
Torsional deflection and vibration eliminated, to all practical purposes.

•
Designed for push-button pre-selective hob shifting and automatic loading (optional equipment).

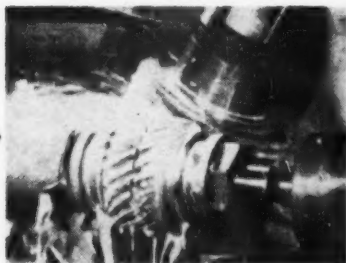
•
Quick positive setup, almost foolproof operation; high versatility.

•
One operator can easily run two or more machines despite high output rate.

•
Conforms to all JIC standards.

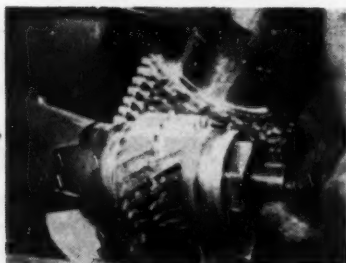
•
Rigid and compact.

... AT 37 SECONDS



Nearing the end of the climb cut.

FINISHED! IN 58 SECONDS



Ready for reloading.



THE PREFERRED KNURLING TOOL FOR SCREW MACHINES

The refinements seen on the R and L Knurling Tool shown here are the result of up-to-date thinking applied to a standard tool. Streamlined for better accessibility, it requires only one hex wrench for all adjustments.

Customers say the most appreciated feature of the R and L Knurling Tool is the set screw which locks the knurl pin in the barrel. Its convenient location at the top of the barrel prevents this screw from being damaged by chips and affords a better lock on the knurl pin.

It is also possible to change the knurls on the R and L Knurling Tool without removing the holder from the turret.

For complete specifications on all R and L Tools listed below, send for our new 28 page catalog.

R AND L TOOLS

1825 BRISTOL ST., PHILA., PA.

TURNING TOOL—UNIVERSAL TOOL POST—FLOATING DRILL HOLDER—CARBIDE AND
ROLLER BACKRESTS—REVOLVING STOCK STOP—TAP AND DIE HOLDER—CUT-OFF BLADE
HOLDER—TURRET BACKREST HOLDER—RELEASING ACORN DIE HOLDER—KNURLING
TOOL—RECESSING TOOL

Remember!

ALLEN COLLETS



Can be depended on for the Best Performance, Extreme Accuracy, Concentricity, Longer Life.



MAIL COUPON TODAY!

ALLEN COLLET MFG. CO., INC.
17720 Claran Ave.
Melvindale, Michigan

Please send catalog and prices.

NAME
TITLE
COMPANY
STREET NO.
CITY ZONE .. STATE

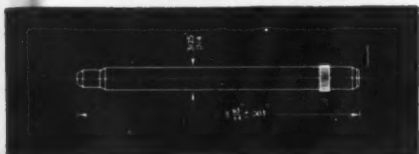
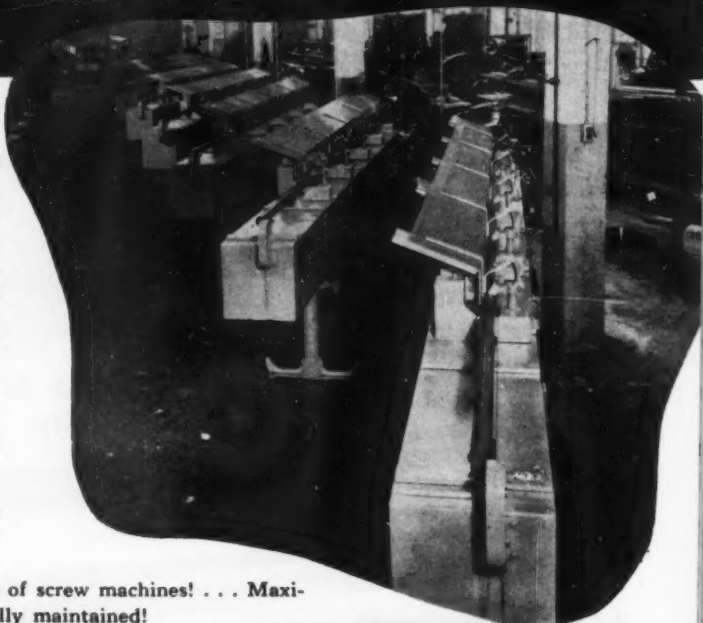
LIPE AUTOMATIC BAR FEEDS

MAGAZINE LOADING

Doubled PRODUCTION!

THE machined worm wheel shaft and agitator rod shown below are typical of the many parts turned out on a bank of seven screw machines equipped with Lipe AML Bar Feeds at Hamilton Beach Division, Scovill Mfg. Co., Racine, Wis., manufacturers of food mixers, vacuum cleaners, hair dryers and other motorized appliances.

No lost time in loading and hand feeding! . . . No scratching of high-finish stock! . . . No idle operation of screw machines! . . . Maximum production capacity fully maintained!



Long worm wheel shaft .3125" dia. machined from piston rod finish, cold-drawn steel. When the Lipe AML Bar Feed automatically loaded and fed the stock to a Model 2G B&S, production increased 100% over conventional loading operation.



Agitator rod .250" dia. machined from S.A.E. #1112 Bessemer wire. When the Lipe AML Bar Feed automatically loaded and fed the stock to a Model 00G B&S, production increased 100% over conventional loading operation.

On job after job there is proof — like these examples from a typical four-week production run — that Lipe Automatic Bar Feeds insure big production gains, BECAUSE:

- Stock is fed to screw machines all the time . . . not dependent on operator.
- Feed pressure constantly behind stock.
- Eliminates feed fingers.
- Avoids multiple feed finger feedouts.
- Model AML gives maximum output of machine . . . no "cutting air."
- Saves change-over set-up time.

Get full details on how this machine will increase production and save you money. It's today's big advancement in screw machine stock feeding. Our engineers will gladly study your problem . . . no obligation.



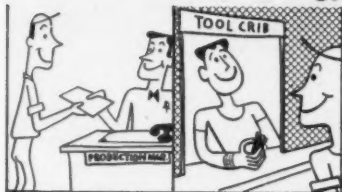
Lipe - ROLLWAY CORPORATION

Manufacturers of Automotive Clutches and Machine Tools
Syracuse 1, N. Y.

Why

UNBRAKO "STANDARDS"

"Standards" keep you in the BLACK



Standard design
and purchase

Standard
tools



Standard (fast) production with
"standards" from stock



Standard (or
higher) profits

"Specials" put you in the RED



Special
design



Special
drawings



Special
purchase



Special (delayed)
delivery



Special
stock



Special
tools



Special
production



Special
bookkeeping



Special costs
(higher)



Special profits
(lower)

UNBRAKO

STANDARD recommends "Standards"

Specify ATLANTIC

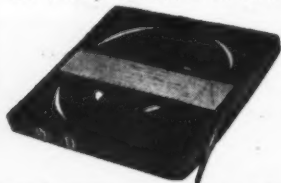
BAND SAW BLADES

For
Smoother



CONTOUR CUTTING

ATLANTIC SAWS meet all of your requirements for a superior blade on complicated die and fixture radius cutting. ATLANTIC specializes in accurate milled and precision set teeth, hardened to exact temper.



Atlantic's strong, practical box, plainly marked on sides and top. Remains in good condition until entire coil is used.

ATLANTIC'S special alloy steel insures longer wear and easier welding.

ATLANTIC'S one temper saw for all metals reduces stock you have to carry. Cut to length and welded, ready for use. Packed in strong Atlantic box. Write for new Atlantic Catalog.

Atlantic Saw Mfg. Co.

INCORPORATED

Exclusively Manufacturers of Band Saw Blades

153 Brewery St., New Haven, Conn.

STOP
Tap Breakage
INCREASE
Production



Exclusive!
Procunier
"Tap Saver"

The exclusive Procunier "Tap Saver" tap holder is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

With the New PROCUNIER High Speed Tapping Head

Industry has long appreciated the many exclusive features and advantages found only in Procunier Tapping Machines. Precision built for faster, more accurate tapping, they have consistently proven their superiority on high-speed production runs. For more than 30 years they have been giving the tapping industry dependable service, insuring cleaner, sharper threads—with fewer broken taps, fewer spoiled pieces.

HERE'S WHY:

1. **Tap breakage is practically eliminated** due to the high sensitivity of the new Procunier cork-faced friction clutch which automatically regulates driving pressure. Dull taps require more driving power than sharp ones . . . thus, even "green" operators can quickly detect dull or loaded taps by the "feel" or pressure on the clutch—thereby avoiding needless tap breakage.
2. **Strain and wear are minimized** and torsion eliminated thru special gear reversing mechanism which distributes pull thru three intermediate gears.
3. **Chuck spindle is supported at both ends** assuring true operation—avoiding tap wobble.
4. **Aluminum housings** assure greater strength and rigidity with minimum weight—a vital factor for high speed tapping. PLUS many other exclusive features.

WRITE TODAY

for full details and specifications on the complete line of Procunier Tapping Machines and see why Procunier offers the "finest in tapping equipment."

PROCUNIER
Safety Chuck Company
14 S. Clinton St. Chicago 6

PROCUNIER SAFETY CHUCK CO., Dept. 7
14 S. Clinton St., Chicago 6, Ill.

Gentlemen:

Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

Name

Address

City

Zone

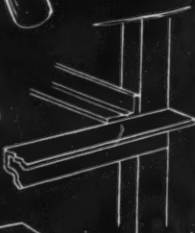
State

ALL THIS



PRECISION

**RIGID
STAND**



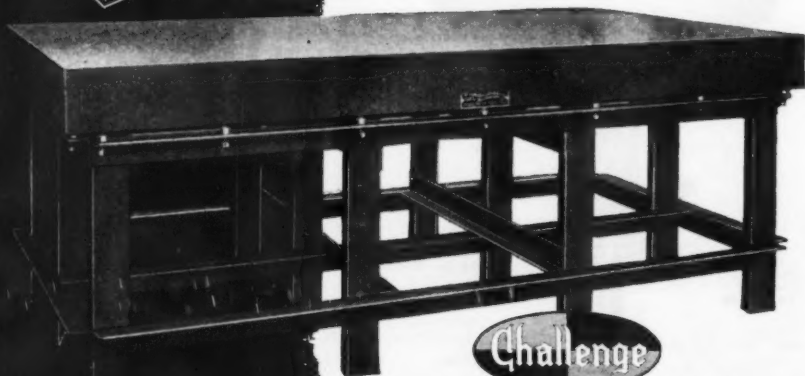
**UNIT
DESIGN**

AND MORE

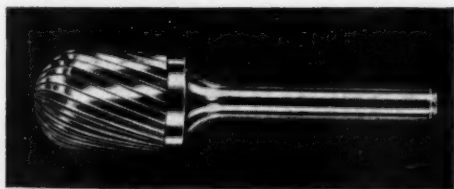
WITH CHALLENGE LAYOUT SURFACE PLATES

Built of fine-grade special analysis semi-steel . . . these plates provide a smooth accurate surface for layout, inspection or assembly work. Six inches thick, 16 standard sizes — 8" thickness and other sizes to order; also special plates with "Tee-Slots" or grooving, scoring, machining as specified. Arc-welded, all-steel stand is equipped with lock leveling screws. Plates can be grooved and keyed so that two or more may be assembled into one complete unit, e.g., four 54 x 144" plates into one 108 x 288" unit. Write for data and prices at once!

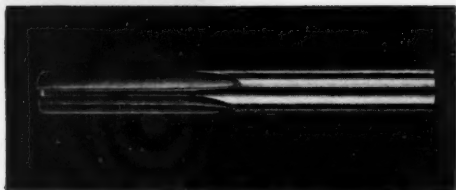
670



THE CHALLENGE MACHINERY CO.
GRAND HAVEN, MICHIGAN, Send for Illustrated Catalog

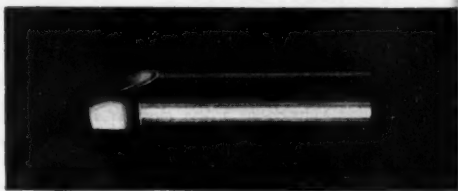


TUNGSTEN CARBIDE



PRECISION GROUND-FROM-THE-SOLID

Special precision
machines bring you
ground-from-the-solid



TUNGSTEN CARBIDE Rotary Files,
End Mills, Reamers, Drills, Boring Bits
and many others.

THE **ATRAX**

WRITE FOR OUR
COMPLETE
CATALOG
NOW



COMPANY
NEWINGTON IN CONNECTICUT

3 pictures
tell the
story...



JIFFY PADDED SHIPPING BAGS

JIFFY SHIPPING BAGS are used extensively to ship precision parts and instruments, highly finished or machined parts, accessories, hand and machine tools and similar items.

Three pictures—the 3 basic steps for speedy packing, tell the entire story of the **JIFFY PADDED SHIPPING BAG** for profitable, dependable and speedy shipping.

STEP 1 INSERT

Simply insert into the bag the item to be shipped. No boxes to set up—no fuss—no bother.

STEP 2 CLOSE

Fold over top of bag. Staple or use gummed tape. No strings, fancy closures or special "know-how" needed.

STEP 3 TAG

Affix label and postage. Package is now ready for shipment.

JIFFY PADDED SHIPPING BAGS are made from strong moisture-resistant kraft with built-in "expansion" cushioning, which protects shipment from moisture, abrasion, dirt and damage during transit.

JIFFY PADDED SHIPPING BAGS are perfect for packing orders in advance, for expected orders and samples. They are ideal for C.O.D. shipments.

Available in 7 standard sizes

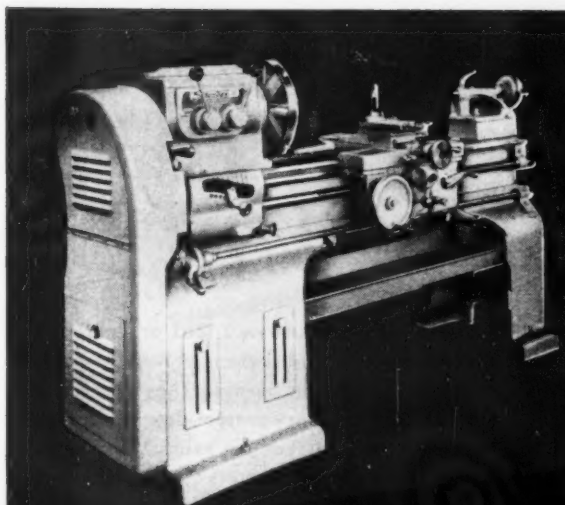
FREE
SAMPLES ON REQUEST



JIFFY

manufacturing company

360 FLORENCE AVENUE • HILLSIDE, N. J.



Designed
for
precision
work!

Sebastian

GEARED HEAD Lathe

**FINER LATHE CONSTRUCTION • GREATER EASE
OF OPERATION • LONGER, ECONOMICAL SERVICE**

Before you buy a general purpose lathe, investigate the medium-priced Sebastian Lathe. It has all the big-lathe features which contribute to consistent accuracy plus time-saving, labor-saving ease of operation.

Precision . . . built-in to last . . . is assured by: Pre-loaded roller bearing supported spindle, bearings on all headstock shafts, oversized heat-treated headstock gears, .0005" accuracy at every alignment point, taper gibs throughout.

Sebastian Lathes invite comparison. Latest literature gives features you should check in *any* lathe, before making a decision. Write for catalog and name of your Sebastian dealer today.

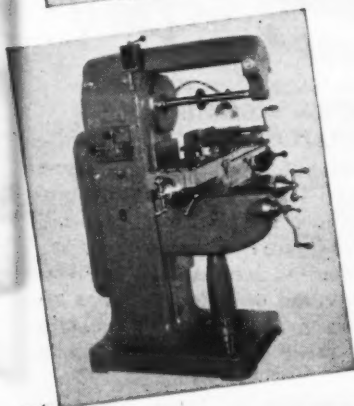
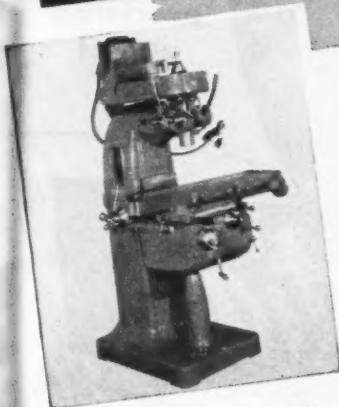
12, 16 and 20"
General Purpose
Lathes, 16 & 20"
Gap lathes . . . all
with 8-Speed
Geared Heads
(16 speeds with
two-speed motor)

SEBASTIAN LATHE DIV.,
5012K1 Brotherton Road

Cincinnati Metalcrafts, Inc.
• Cincinnati 9, Ohio

**MAKE
INDEX**
Your Choice

Get a Head Start on Production
with **these RUGGED, VERSATILE,
EXTRA CAPACITY
MILLING MACHINES**



Whether it be the heaviest jobs or light production, you will find these improved, low-cost machines ideal for the purpose. They offer speed and precision to meet present-day stepped-up schedules, while assuring a substantial saving in time and labor. Get details about their many advantages now.

Model 55 IMPROVED VERTICAL MILL. A speed range of 80 to 2700 RPM's combines with a 1 H.P. drive, 3/4" quill, and extra rugged spindle mounted on over-size precision ball bearings to give a capacity of 1/8" to 1 1/2" end mills in steel. Spindle quill travel is 5 1/4" either by lever, hand wheel, or power, and has adjustable positive stop and automatic safety throw-out. Table 40" x 9" or larger. Longitudinal table power feed has 8 geared feed changes.

Model 60 PLAIN HORIZONTAL MILL. A full No. 1, that in many ways equals or exceeds a light No. 2 in capacity. Low maintenance due to all rapid moving parts running in oil, hardened alloy gear train, and fully ground alloy steel spindle mounted on pre-loaded precision ball bearings requiring no adjustment. Standard table 40" x 9" overall, with larger table optional, is supported by 18" of saddle bearing, and has accurately ground lead screws for transverse and longitudinal movement. Constant flow coolant system of 8 gallon capacity starts and stops with spindle.

Write for Literature

INDEX MACHINE CO.

540 N. MECHANIC STREET

JACKSON, MICHIGAN

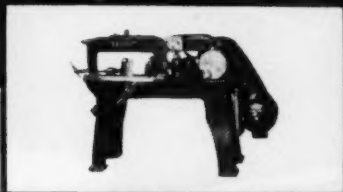
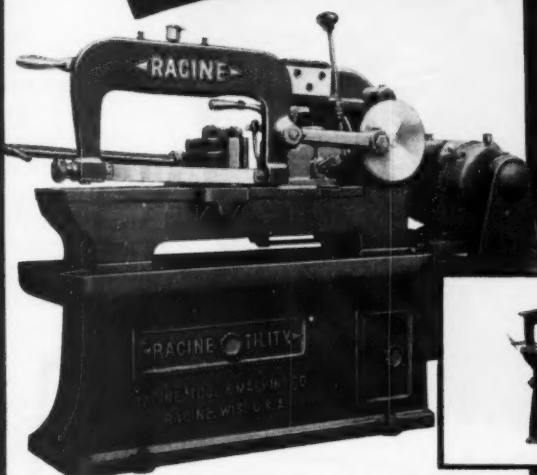
SPOILAGE

LOW PRODUCTION

THESE BOYS STEAL PROFITS

DOWN TIME

HIGH MAINTENANCE



Unreliable, antiquated metal-cutting equipment may be an unsuspected source of profit loss in your shop.

Step up production and profits with new modern Racine Metal Cutting Machines. Completely hydraulic, requiring minimum service and maintenance, Racine Machines reduce cut-off time, save material improve the profit picture.

There is a machine in Racine's complete line for every metal-cutting job. Capacities 6" x 6" to 20" x 20". Single purpose and automatic bar feed machines.



RACINE

STANDARD
FOR QUALITY
AND PRECISION



Why say more?

Courtesy Heald Machine Tool Company

Accuracy always appealed to this old friend—The Heald Machine Tool Company. Here they are boring, facing and reaming numerous holes in a 1360-lb. casting.

They say, and we quote: "We bought this Cincinnati Bickford Super-Service Radial Drill to increase war-time production. We also have ten large and a flock of smaller ones. Why say more?"

Cincinnati Bickford Super-Service Radial Drills are always accurate, dependable tools, highly productive and profitable in the shop.



*Equal Efficiency of Every Unit
Makes the Balanced Machine*

THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.

AS THE

Editor

SEES IT

Our Untapped Labor Pool of 5,000,000 Workers

40,000 to 100,000 men are needed by the metalworking industry if the various segments of the industry are to meet their production goals during the coming year. The difference in estimates is brought about by the inability of government bureaucrats, business people, and various amateur crystal ball gazers to gage the manpower needs accurately. Be that as it may: manpower is a problem....

Unfortunately, industry as a whole is not doing as much to solve the manpower situation as it might, even though there exists today a labor pool of 5,000,000 physically handicapped workers.

I am constantly amazed, as I visit plants, how many able-bodied men sit around on benches and perform assembly and inspection operations. Both are occupations which could, and should be, performed by the handicapped. If a plant were to hire only twenty handicapped workers, twenty able-bodied men could climb off their stools and become machine operators. A general in-plant training course could develop a number of promising tool and die makers, and other skilled workers.

In this issue of the BLUE BOOK is an article dealing with the experience of the Supreme Engineering Company who have hired only handicapped workers, many of whom have lost a couple of legs or arms. They're doing a bang-up

job at Supreme, and according to James Rivers, president of Supreme, need less "coddling" than the worker in full possession of his limbs.

Some companies, of course, make it standard policy to employ handicapped workers whenever possible. The Ford Motor Company employs ten per cent handicapped labor in all its plants, a practice they've been following for thirty years. Other plants also have definite policies regarding the use of handicapped workers, and it is gratifying to note that nothing but praise is given the workers who, for one reason or another, have lost the use of some part of their bodies.

Companies who have employed these workers claim them to be loyal, efficient, conscientious and easy to get on with. To be sure, much depends on the type of jobs the handicapped workers are asked to fill, but if the job is of such a nature that their handicap is no deterrent, management will gain much from their employ.

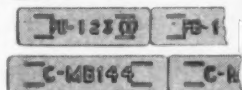
This is the time when the handicapped workers should be given their cue, not out of charity, nor out of pity, but because the handicapped workers can deliver the goods: give a full hour's work for every hour's pay, and that's more than some able-bodied workers give.

William F. Schleicher

USE

**PANNIER
"MASTER MARKER"**

**Nicked and
Notched**



NAVY CABLE TAGS



other styles too



METAL SAFETY TAGS

*for Positive
Identification*

and safe, efficient handling

Materials and tools are efficiently separated, stock bins easily marked and shipping legibly identified when you use Pannier SAFETY TAGS. Durable, easily attached, and proof against defacing, these tags are supplied blank or with company name; are available in individual units or coiled lengths, and in tin, copper, brass, aluminum, steel, stainless steel and other metals .014" thick or lighter. Coiled tags are nicked for easy separation, and notched for proper feeding into Pannier or other embossing machines; are available with slots or holes as desired.

FREE DATA!

Ask for Bulletin D-10, giving full information about Pannier SAFETY TAGS and Embossing Equipment.

OFFICES: Chicago • Los Angeles • Youngstown • Philadelphia • Jacksonville

THE PANNIER CORPORATION



203 Pannier Building

Pittsburgh 12, Pa.

Featured **IN THIS ISSUE**

NOVEMBER, 1951

Metalworking plant holds rejects to 4%	105
Overhead tiering uses new stacker crane	119
Compression formed seamless tubing cuts costs	157

Washington news letter, by Arnold Kruckman, Washington correspondent. Page 93
Metalworking plant holds rejects to 4% by stiff inspection, by James Joseph. The Cherry Rivet Co., Los Angeles has found that trained inspectors, replacing inspection by machine operators, has considerably reduced rejects of its mechanical "blind" fastening rivets. Special testing devices further reduce the quantity of rejects. Page105

Overhead tiering at du Pont using new stacker crane, by Fred A. Miller. This new materials handling facility, developed to maintain maximum storage capacity, has achieved startling economies since its development at du Pont. Page119

How to improve plant layout and the use of equipment . . . part I, by Dr. Thomas G. Willsin, consulting engineer. A survey of the ideal conditions of production which may be attained through proper plant layout, with six specific factors which may be stressed is set forth in this interesting three-part series beginning in this issue of the Blue Book. Page138

Compression-formed seamless tubing can cut machining costs, by L. A. Karg. The Rockrite process, developed by Tube Reducing Corp., Wallington, N.J., a new process of compression sizing of tubes, has been found to reduce machining costs. Closer tolerances, fine grain and uniform micro-structure, with shallow decarburization are among the characteristics of this process. Page157

Handicapped workers are efficient, loyal . . . represent untapped labor market, by Frank Charity. Several West Coast plants have learned that by dipping into the reserve source of some five million handicapped workers in the U. S., they have

found a useful, earnest and loyal group of employees. Paraplegic veterans, the industrially disabled and the blind are among the group which have been successfully trained to perform specific duties. Page 174

How to evaluate your supervisors' training program, by Edmund Mottershead. Still another in the Blue Book series by this well-known authority on industrial relations. The advisability of training foremen and similar supervisory personnel is covered in this article, with several suggestions as to group and individual evaluations. Page189

The 33rd National Metal Exposition and Congress will be held in Detroit this October. Added attraction will be the first meeting of the World Metallurgical Congress which is composed of scientists from all parts of the world who will share their knowledge at the Congress.

An estimated 34,500 executives and production men, representing more than 8,200 metalworking plants attended the 1950 show, and it is expected that this figure will be topped in 1951.

List of exhibitors and their booth numbers are a part of this section. This list is accurate up to press time.207

Professor Reichardt's quizzes. Page 151-220

Available literature. Page225

New books. Page234

News of the industry. Page240

Modern tools in action. Page251

Shop hints. Page257

What's new in metalworking. Page.....261

Mechanics through the ages. Page333

Products index. Page340

Index to advertisers. Page346



giant

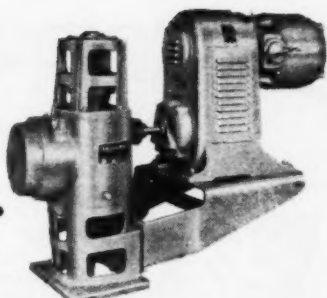
Versatility of this new LeBlond 16/38" Sliding Bed Gap Lathe is demonstrated at Mixing Equipment Co., Inc., Rochester, New York. The irregularly shaped semi-steel base, below, swings 33" overhangs 18" depth of cut intermittent, 3/32" spindle speed, 86 rpm feed, .014" tool, carbide. The 14" AISI 304 Stainless Steel shaft and coupling, above, are accommodated without special equipment; by extending the bed, the coupling is turned to limits of .001" depth of cut, 1/16" spindle speeds, 166 rpm roughing, 212 rpm finishing, feed, .010" tool, carbide.

"eggbeaters"

for industry

These huge mixers (up to 500 hp) do a big job of "eggbeating" for industry. They're used to blend chemical formulations—to mix pulp for paper—to combine ingredients for thousands of everyday products.

In producing these mixers, Mixing Equipment Co., Inc. of Rochester, New York, has to turn a variety of work . . . from short parts with irregular swings up to 33", to shafts as long as 14'—materials from brass to stainless steel—intermittent cuts to heavy roughing cuts to smooth finishing cuts—tolerances down to .001". All this calls for a rugged precision lathe of unusual versatility. That's why Mixing Equipment Co., Inc. installed a new LeBlond 16"/38" Heavy Duty Sliding Bed Gap Lathe, recommended by LeBlond Distributor, F. W. Schiefer Machinery Company of Rochester.



This multi-purpose LeBlond Sliding Bed Gap Lathe is a sweetheart in the shop. It has adjustable gap and center distance, and with bed closed, it operates the same as a standard heavy duty engine lathe. Twenty-four or forty-eight spindle speeds are available, 11 to 673 rpm or 8 to 1010 rpm, respectively—sixty feeds and threads—up to 15 hp. And of course you get all the well-known LeBlond features—hardened and ground steel bed ways, totally-enclosed quick-change box, automatic lubrication, one-piece apron, thrust-lock tailstock and many more.

Whether your turning jobs call for versatility or production, heavy hogging or fine finishing, there's a LeBlond Lathe to turn them faster, better. Your LeBlond Distributor will tell you about the three Sliding Bed Gap Lathes, 16"/38", 25"/50" and 32"/60". Call him or write—

THE R. K. LEBLOND MACHINE TOOL CO., CINCINNATI 8, OHIO

Ask for Bulletin SBG 103

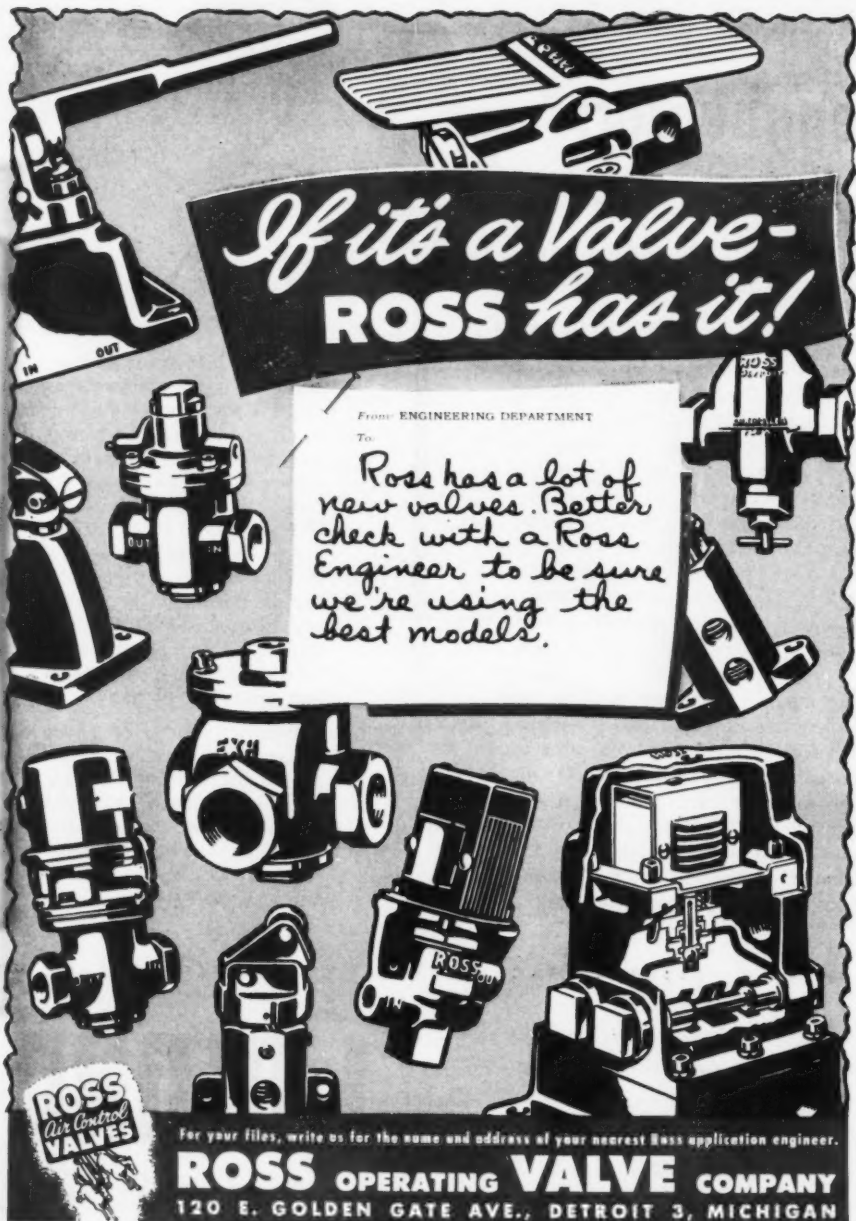
for complete information on

LeBlond Heavy Duty Sliding Bed Gap Lathes.

turned faster by



WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 64 YEARS



If it's a Valve-
ROSS has it!

From: ENGINEERING DEPARTMENT

To:

Ross has a lot of
new valves. Better
check with a Ross
Engineer to be sure
we're using the
best models.

ROSS
Air Control
VALVES

For your files, write us for the name and address of your nearest Ross application engineer.

ROSS OPERATING VALVE COMPANY
120 E. GOLDEN GATE AVE., DETROIT 3, MICHIGAN

by Arnold Kruckman

Washington Correspondent



Defense Mobilizer Wilson told the machine tool industry they might increase their base period prices 12%; that they would be allowed to further increase their prices by adding most of the disputed labor and material costs between the end of the base period and the 10 September 1951. The industry was given superiority in obtaining metals and tools, and "steps are taken to insure the industry an adequate supply of man power." This promise was dated 21 August. This is written 15 September. While the other promises may have been fulfilled, the industry still does not get the promised man power.

Typical is the incident of the machine tool builder who last April asked permission to raise some wages of workers who were under pressure to take other jobs. When Wilson made his recent statement the employer happily expected there would be immediate action. He has found his application is approximately the 4000th awaiting processing by the Wage Stabilization Board. He has been told that it may be reached by 1 January, or it may be reached in 1953. No one in WSB is able to tell him exactly. They blandly say they have had no Directive from Defense Mobilizer Wilson, and have neither authority nor reason to give preference to machine tools, or any other employers' applications. WSB explains it is still engaged in formulating policies. Policies must precede processing. Trouble seems to be that the top levels of WSB consist of academic persons, or amateurs, who dally with theories but are treacle-slow in getting down to practical realities. There are only two layers in WSB—those at the top and those below. The lower level chiefly consists of the mechanical clerk-minded personnel without initiative and without authority. Orders and releases are showered from above like leaves that fall in Vallombrosa. But there are no executives and administrators to do anything about them. Situation reflects large part of operational defects of the whole Washington machine. Slogan is: "Don't stick your neck out!" Meanwhile, there is little evidence of any exemption of highly-trained personnel by the Pentagon or by the draft boards, nor is there any sign of a Directive from Wilson. . . .

* * *

Clay P. Bedford, Deputy Defense Administrator for Procurement and Production, ODM, from Kaiser-Frazier Corporation, Oakland, Calif., largely is responsible for licking the machine tool bottleneck. Probably someone should put the pressure on him about the WSB bottleneck. . . . Defense Department, and Atomic Energy have a new "DX" rating to give 'em preference over all other ratings to obtain any end-products not classified as controlled materials - things urgently needed but not of direct military character. . . . CMP metals are not going overwhelmingly - at least that's what they tell us here - to defense

producers of machine tools, power equipment, transportation equipment, chemical industries, expanding steel plants and atomic energy. . . . Machine tool shortage reported most severe in fields of specialized items, new military needs and aircraft requirements. Amazingly loquacious - in releases - ODM Wilson, insists machine tool industry must produce 3 billion worth through 1953, with hope of \$800 million worth this year, and \$1,600,000,000 worth in 1952. But more machine tools are needed than the 1953 goal by reason of constantly expanding aircraft program. . . . German machine tool production rose from 780,000 tons, June, 1950, to 1,440,000 tons, June, 1951. . . .

* * *

Early September Vice Admiral A. G. Noble, Chief, Naval Material, invited those requiring machine tool operations (to complete Army, Navy and Air Force contracts), to use Navy facilities. Offer is open only to firms which can't get timely delivery from private sources. Offer will be cancelled when machine tool industry can meet needs. Contractors should inform contracting officer of Service who will arrange to have work done at a Navy facility. . . .

* * *

Central inventory of equipment held by Armed Forces was established to ease machine tool shortage, by Munitions Board, early September. All three Services will locate Defense Department machine tools not in actual use. Any Service requiring a machine tool is to draw on reserves of other Services. Central inventory record is located in Old Post Office Building, Washington 25, D. C., listing all types of machine tools covered in Exhibit "B," NPA Order M-41. Operating rules, established by Munitions Board, are administered by C. E. MacArthur brought from machine tool industry. Munitions Board cautions against over-optimism. Suggests even if every machine tool were put to use many bottlenecks would remain, and machine tools will continue to be No. 1 defense bottleneck. Stockpile of machine tools, set aside after World War II, intended to meet all mobilization needs. Establishment of a long-range stockpile program, paralleling the critical materials stockpile, is now under active consideration. . . . ODM repeatedly states auto industry will become prime contractor for machine tools during next few months. Industry will get maximum help 12 months ahead. . . . Labor Department, March, 1951, reports 20 major industries have on hand total of approximately 2 million tools of all kinds. . . .

* * *

First machine-tool Fair was held in Paris in September. Six hundred exhibitors from 12 European and North American countries showed 200 items in working order. . . . ECA's William C. Foster, who becomes Deputy Secretary of Defense, declared French producers are not getting most efficiency out of their new machine tools supplied by U. S. French workers are not keeping step with doubling of their h.p. during past two-three years. Some, however, snap into it. Before September, 1949, Foundry Division, Japy Freres, Beaucourt, France, lost about \$5,700 a month. Since getting ECA ideas Foundry makes profit of \$2,850 a month, especially after 24-year old plant manager came over and spent six weeks in American grey-iron foundries. His plant now absorbs 10% to 15% higher costs from raw materials,



high boring costs make you blue?

LET THE MAN WITH HOLES IN HIS HEAD LOWER THEM FOR YOU

Every Madison cutter, and bar, no matter what its size, is designed to do your boring operations faster at lower cost. With Madison cutters and bars you never get those high-boring-cost-blues.

Madison cutters range in diameter from $\frac{1}{8}$ " to any desired size. Madison bars range from $2\frac{1}{2}$ " to fourteen feet in length . . . or longer. The secret of Madison's ability to cut costs is Madison's exclusive cutter and bar design. First, there is Madison's two bladed cutter. It provides generous chip clearance . . . permits faster cutting without overheating. Second, is Madison's exclusive float design. Cutters float in Madison bars, special floating tool holders are never needed . . . both edges of the cutter take an equal bite. That means more holes per cutter, longer cutter life with fewer regrinds. You get these features, plus many other Madison advantages, when you ask the "Men With Holes in Their Heads" to cut your boring costs. Write today. A brief letter will do.

Write for the information filled Madison Catalog: It is yours for the asking.



MADISON

MANUFACTURING COMPANY

DEPT. 99

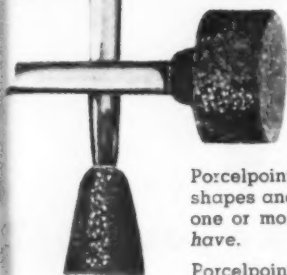
MUSKEGON, MICHIGAN



the
proof
is in



performance
WHEN YOU USE
PORCELPPOINT
Mounted Wheels



Porcelpoints are mounted abrasive stones furnished in all standard shapes and sizes. They are furnished in 4 grades of which you'll find one or more grades that will meet the requirements of any job you have.

Porcelpoints consist of approximately 80% abrasive grain bonded with 20% porcelain. The wheels are mounted on cold forged needle bar stock shanks and are practically indestructible. Porcelpoints will not only reduce costs but will revolutionize die sinking practice, deburring and foundry cleaning practice as a result of their toughness and long life.



**TRY THEM ON YOUR NEXT JOB AND THEIR
PERFORMANCE WILL PROVE THEY HAVE NO EQUAL!**

Write Today . . . Send for catalog and large shape & size identification wall chart on Porcelpoint Mounted Wheels.

THE
Metal
REMOVAL CO.
THE WORLD'S LARGEST STOCK OF
DIE AND MOLD FINISHING SPECIALTIES

1546 N. ORLEANS STREET



CHICAGO, ILLINOIS

25% wage increases, and other costs. Man-hour production time per ton was reduced from 222 to 83. Production now is 75% better than French average. Communists charged new methods and machines were the hated American speed-up system. But 25% increase in pay envelopes licked the propaganda. . . .

... "B" products-list, CMP and rating numbers, under metal working machinery and equipment, are N8, P1 and P6 NPA announced machine tool builders have first call on products of their own industry. Tools needed will be located, and NPA will order builders to divert them from intended customer to machine tool builder who needs them Machine Tool Industry Advisory Committee met with NPA Metal Working Equipment Division to urge elimination of bottlenecks in component parts, such as large bearings, electric motors, switches, alloys, pumps - lack of which seriously delays shipments. NPA declined to make any material change in practice, and said it would continue to handle spot shortages with individual Directives, or "on spot assistance."

* * *

ECA supplied \$24 million for new plant at Sunndalsoera, Norway, to produce aluminum, the investment to be repaid to our stockpile with 7,800 tons annually. Equipment was purchased in Denmark, West Germany, France and Norway. . . . Turkey is buying \$57,000 worth of machine tools with ECA dollars. . . . Steadily rising volume in production of light machine tools reported in Western Germany, especially for export. Overall tools sales, 1949, dollar marks 47 million; 1950, dollar marks 122 million. Business stimulated by international armament boom. . . . ECA dollars for machine tools are available with 10 Dutch firms; one Austrian firm; names and addresses can be supplied. Indo-Chinese purchasers wish to buy machine tools and other working machinery, through C. Buettner, GSA, 7th and D Streets, S.W., Washington 25 (Room 7123D, 'phone Republic 7500, ext. 2464). Refer to ECA-95-890-F002-6706-10SB. Mr. Buettner also is buying machine tools for China and Formosa. . . . Dr. Kwame Nkrumah, Minister of Development and Leader of Business Government, Accra, Gold Coast, Africa, is buying tools and equipment for metal plants. . . . Israel Government is training 18,000 - including 10,000 new immigrants - in metal work at Jerusalem. . . . Fifteen Frenchmen for five weeks are visiting 11 U. S. cities to study methods of increasing production of machine tool accessories and power hand tools, critical items in Western Europe. Itinerary included Geometric Tool Co., Simonds Saw & Steel Co., Ex-Cell-O Corp., American Broach & Machine Co., Carboloy, Inc., De Vilbiss Co., Independent Pneumatic Tool Co., Ladish Co., and Gisholt Machine Co., American Tool Co., Black & Decker Mfg., Co., and Henry Disston & Sons, Inc. . . .

* * *

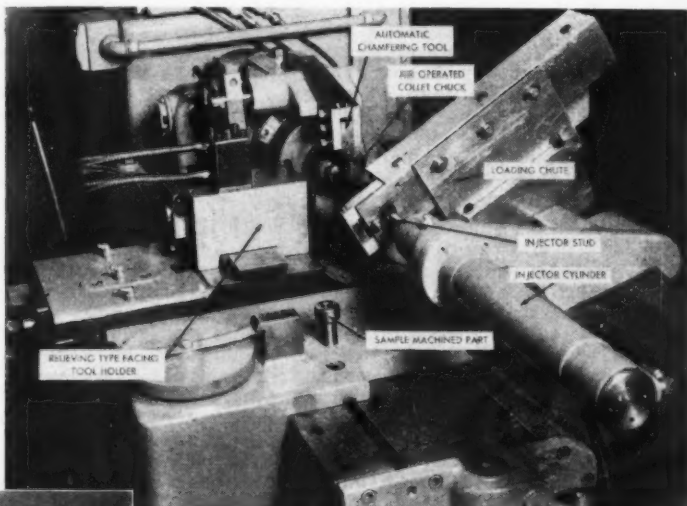
If you wish to export your industrial techniques, processes, patents - sometimes special equipment - to go into business abroad, register with ECA, Industry Division, Investments Guarantees Branch, Washington 25. No actual cash investment usually required; but licensing almost invariably swells profits. ECA protects such enterprises. For example, a West European company seeks to manufacture American machine tools under license. Refer to Proposal No. 290 when writing ECA.

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

Automatic Loading enables the machine to produce to its full mechanical efficiency by eliminating the human equation.

AUTOMATICALLY LOADED IMP LATHES CUT MANUFACTURING COSTS



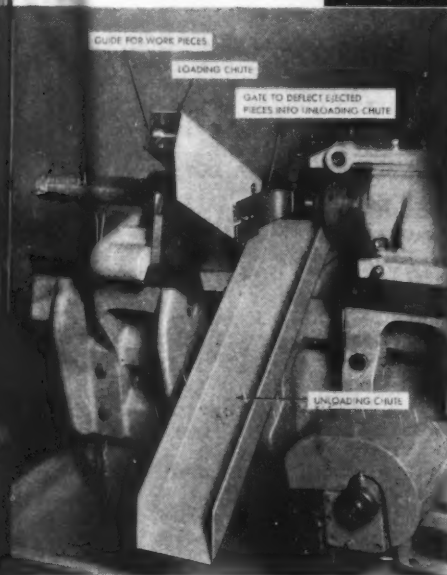
Problem: To finish face and chamfer bore of pump gear true with bearing diameter.

Solution: A Lo-swing IMP Lathe was fitted with an injector type automatic loader which provides a fast, completely automatic cycle, entirely eliminating hand loading.

Partially machined pump gears are placed in a loader chute and fed by gravity to the loader injector arm which picks up and places the part in an air operated collet chuck.

A relieving type tool block on the front slide performs the facing operation, then is automatically relieved during the return stroke to avoid spiral tool marks. The chamfering operation is done with a swinging type tool block on the headstock, automatically operated by a cam mechanism working in conjunction with the front cross slide. On completion, the pump gear is automatically ejected by a plunger located in the bore of the spindle.

Lo-swing Lathes fitted with Automatic Loaders are usually grouped together in series of two or more, since one operator can easily service several machines. Let Seneca Falls engineers help cut your turning costs.



PRODUCTION COSTS ARE LOWER WITH Lo-swing

How's BUSINESS?

Aid small users of controlled materials

To relieve small users from difficulties in placing orders of steel, copper and aluminum, the NPA amended Direction 3 to CMP Regulation 1, which governs the placing of such orders.

Under the amendment, no manufacturer whose quarterly allotment or advance allotment of carbon steel is equal to or more than a carload lot shall be required to reduce his delivery order for such material below a carload lot. He may order the full carload despite the fact that the amount may exceed the total permitted to be ordered in one month under Direction 3.

Direction 3 prohibits any manufacturer from ordering for delivery in one month more than 35% of his total quarterly allotment of any controlled material. NPA explained that users of small quantities of carbon steel may thus purchase directly from steel mills and thereby save on transportation costs.

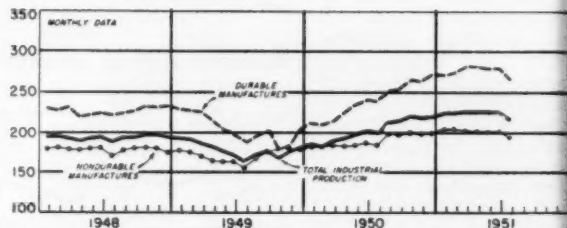
The amendment also permits a manufacturer to order up to 50% of his advance quarterly allotment of steel, copper and aluminum for delivery in any one month for which the allotment is valid. In this case, a manufacturer is

Business indicators

Source: Dept. of Commerce

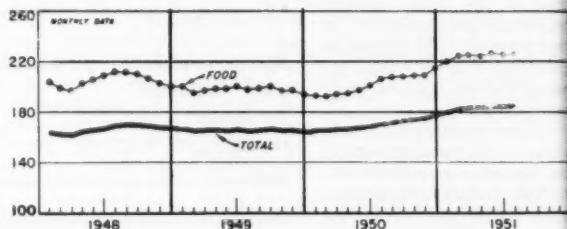
Industrial production

(seasonally adjusted, 1935-39=100)



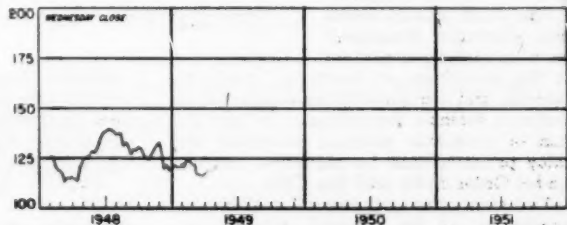
Consumer's prices

(1935-39=100)



Prices of 365 industrial stocks

(1935-39=100)



permitted to exceed 35% of his quarterly allotment because advance allotments are percentages of his current quarterly allotments.

14 ferro-alloying materials under control

14 ferro-alloying materials and ferro-alloy products have been brought under centralized control, with six of the number being placed under complete allocation.

Distribution and use of the alloying materials will be controlled by Order M-80. This order, plus seven schedules issued in conjunction with it, supersede regulation of the alloys and alloy products under eight separate orders, including the iron and steel Order, M-1.

NPA said that rigid regulation of the distribution and uses of the scarce alloying materials and alloy products is necessary to assure the most advantageous use possible in the interest of the defense program and activities essential to the civilian economy.

Large quantities of such critical alloying materials as tungsten, molybdenum, nickel, cobalt, columbium, and tantalum are consumed in the manufacture of stainless high speed tool, and other alloy steels, and in electric bulbs and electronic equipment parts.

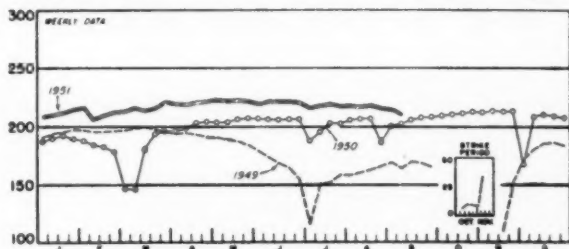
The high alloys steels and electronic equipment parts are vitally important in the production of weapons, munitions, aircraft, and communications equipment for national defense. Accordingly, the distribution of available alloying materials and alloy products must be regulated carefully under Order M-80 and the CMP.

The new order requires all melters and processors of the affected alloying ma-

Business indicators

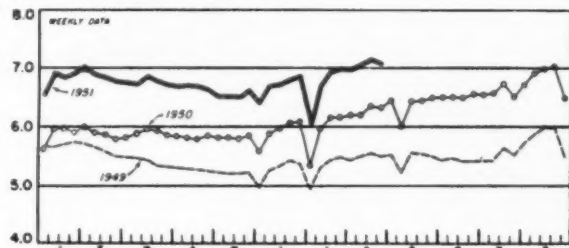
Steel ingot production

(1935-39= 100)



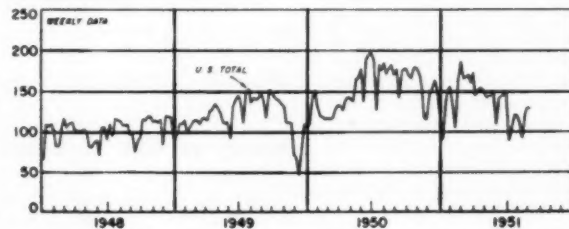
Electric power production by utilities

(billions of kilowatt-hours)



Motor-vehicle production (passenger cars and trucks)

(thousands of vehicles)



terials to report to NPA their schedules showing the percentage of each mix for steel products or other proposed processing for the month following submission of the report.

Complete allocation will be made of nickel, cobalt, columbium, tantalum, tungsten, and molybdenum because of the

Pantography at Work



Inside profiling operation produces more than 36 pieces per hour with Gorton Tracer Control. Approximate time by the next best method . . . one piece every two hours.

GORTON

- IMPROVES QUALITY
- INCREASES PRODUCTION • CUTS COSTS

On many all-but-impossible jobs, Gorton Tracer-Controlled Pantographs and Duplicators speed up production on military or industrial contracts. High surface finish results from spindle speeds up to 45,000 R.P.M. Accuracy results from the use of over-size masters, patterns, or templates together with the reduction ratio which is exclusively characteristic of the pantograph. Whether a dozen or a thousand pieces, each is identical to the first. Work piece size varies from instrument parts to areas of 10 to 20 feet.

Gorton tracer-controlled equipment quickly pays for itself in profiling, routing, die sinking, mold cutting, counterboring, chamfering, grooving, graduating, engraving as well as many other standard or special operations on ferrous or non-ferrous metals and plastics where work is flat, uniformly curved, cylindrical, spherical or irregular in shape.

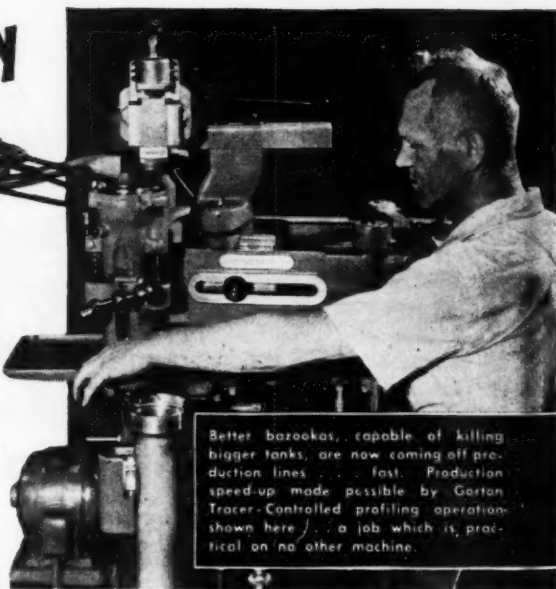
Mail the coupon below for General Catalog illustrating the complete Gorton line.

GEORGE
GORTON
MACHINE CO.



1411 Racine St., Racine, Wis., U.S.A.

November, 1951



Better bazookas, capable of killing bigger tanks, are now coming off production lines . . . fast. Production speed-up made possible by Gorton Tracer-Controlled profiling operation shown here . . . a job which is, practical on no other machine.

PRODUCTION DATA—

JOB: Profile & locking lugs for male and female sections of new 3.5" Bazooka

MATERIAL: Aluminum alloy

CUTTER: 5/32" dia. single flute, fast spiral H.S. steel running at 3,900 R.P.M., without coolant

MASTER: 2 masters: one for male and one for female sections; 3 times oversize, traced manually

HOLDING FIXTURE: Pneumatic-operated internal expanding type

APPROX. TIME: 36 pieces per hour

ALTERNATE METHODS: None practical

Please send at once complete information about the Gorton line contained in Bulletin 1655-1411.

Firm

Name

Title

Address

City, State

P3554-R



Precision Rod Cutting at High Speed

with the New DI-ACRO ROD PARTER

The DI-ACRO Rod Parters further increase the applications of "DIE-LESS DUPLICATING" as a cost cutting, time-saving production technique.

Do you require precision—DI-ACRO Rod Parters hold tolerance to .001" on duplicated cuts. The ends are square, and roundness is maintained.

Do you want speed?—The Rod Parters exceed outputs of other methods with equal accuracy, on rods and bars up to $\frac{3}{8}$ ". Torrington Roller bearings incorporated in an exclusive multiple leverage arrangement provide remarkable ease of operation.

DI-ACRO Power Parter has air cylinder cushioned for quiet and efficient operation. Each cutting cycle obtained with 4-way foot valve—leaving operator's hands free.

"PARTS OFF" MANY MATERIALS

All Hot and Cold Rolled Rods • Stainless Steel • Chrome Molybdenum • Fibre • Brass • Aluminum • Bi-metals • Many Types of Plastics • Copper • Rubber • Wood



GET "DIE-LESS DUPLICATING" CATALOG!

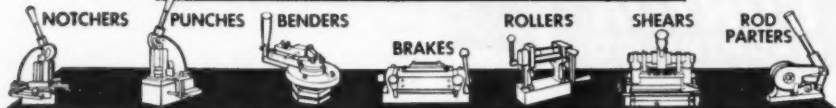
Shows parts duplicated by DI-ACRO Benders, Brakes, Shears, Rod Parters, Rollers, Notchers, Punches.



**DI-ACRO
POWER PARTER**

314 8th Ave.
Lake City, Minn.

O'NEIL-IRWIN



scarcity of supply in relation to requirements. The materials in this group will be referred to hereafter by NPA as "restricted alloying materials."

Lick unemployment

Mt. Carmel, Pa., in the hard coal mining area, had considerable unemployment. A newspaper reporter suggested a campaign to give people jobs. This resulted in the establishment of a metal working business, known as Redmond Machine Works, Inc. It's a non-profit business with a Board of two County Court Judges, a newspaper man, an optometrist, dentist, insurance agent, and four elected officials. Machines and equipment were gathered from various places on various terms; an empty garage was occupied. The plant now employs 150 people who make precision dies and tools, parts and equipment. Redmond has obtained sub-contracts on national defense work, and other regular metal products, assuring good business for some time ahead.

Defense Materials Administration

This agency has Jesse Larson at its head and will make possible rapid write-off to produce 9 million tons of additional domestic iron ore by the end of 1956; 41,000 tons of copper; 36,000 tons of lead; 77,000 tons of zinc; 108 million pounds magnesium; 8 million pounds titanium; 127,000 pounds tungsten; 29,000 million pounds molybdenum.

CPS and copper

OPS trouble is anticipated in the ceiling of 24.5c per domestic pound of copper; the world price is 27.5c with imports rapidly going down. Wilson has formally pledged to split all copper available with Europe and Asia, regardless of price and stockpile, through International Materials Conference. This obviously stops OPS from raising domestic copper price to complete in foreign markets for copper.

Copper strike is described as really two copper disputes. It stems from hatred between Mine, Mill and Smelter Workers Union and CIO, the latter having kicked MMSW out because MMSW is notoriously leftist. MMSW people oppose CIO decisions, and are reluctant to accept WSB rulings.

More steel for consumers

The NPA announced allotments of steel, copper, and aluminum for production of consumer durable goods during the fourth

quarter of 1951. The allotments are slightly larger than announced on July 27 when the Defense Production Administration listed its tentative fourth quarter allocations for fourth quarter goods. The increase resulted from a re-examination of the needs for both defense and non-defense production in order to permit the highest possible output of essential consumer durable goods.

Amounts available for production of consumer goods are:

Steel products: 984,793 tons, including 950,303 tons of carbon steel, 24,400 tons of alloy steel, and 10,085 tons of stainless steel.

Copper products: 53,900,000 pounds and including 42,550,000 pounds of brass mill products, 8,900,000 pounds of wire mill products and 2,450,000 of foundry products.

Aluminum: 59,000,000 pounds.

Consumer durable goods are classified in two broad categories: those which are directly related to the defense effort and those items not directly related to the defense effort. Products in the first category and the rate at which production will be supported, include electric light bulbs, with half of the production taken by industry, 90%; safes and vaults, 65%; shelving and lockers, 70%; professional furniture used by doctors, dentists, hospitals and others, 70%; hospital utensils, 75%; license plates, 100%; uniform and apparel fastening devices, 65%; etched products, chiefly specification plates used on electric motors, radio equipment and similar items, 60%; portable lighting devices, 90%; dry cell batteries, 90%; food products machinery, 76%; commercial cooking equipment, (electric) 87% (non-electric, 75%); commercial dishwashers, 99%; marking devices, 60%.

To support the necessary level of production for these items it is necessary to reduce the use of carbon steel by producers of other less essential consumer durable goods to an average of 58% of the base period (either the first six months in 1950 or the last six months of 1949); compared with an average permitted usage during the third quarter of 70% of the base period. Other types of steel, such as stainless steel which is needed to support the jet engine program, will be available only in lesser quantities. The allotments for copper are based on an average of 54% of the base period, and for aluminum, approximately 46%.



Which Steel Bends the Most ?

One of the bars being tested above is a standard low carbon steel. Good steel, yes, but not noted for hardness or extra strength. The other is a high strength, heat treated alloy steel metallurgically designed to outperform the first steel in most every way. Yet, as shown in the picture, when both bars are of the same size and length and carry the same load, both bend the same amount.

Why is this so? In spite of what common sense indicates, the ability of a steel to resist deflection (bending) is not dependent upon the composition or mechanical properties of the steel—but on the design or size of the structure. The technical man puts it this way, "All steels of the same size and shape, when subjected to the same stress will deflect practically the same amount regardless of composition or physical properties, pro-

vided the imposed stress does not exceed their elastic limits."

Just what does this mean to you? Simply that if too much deflection occurs, the only remedy is to use a larger size or a different shape. Changing to a higher strength steel allows greater deflection without permanent distortion (the elastic limit is higher), but the bending itself will not be lessened.

This interesting and odd steel fact is probably well known to you. However, the fast changing analyses and requirements of the defense program have brought new situations—new problems on which you may need counsel. Whenever you feel the need to discuss a steel question with others, we sincerely invite you to talk with experienced Ryerson steel men. They will work closely with you, and their experience may be particularly helpful to you at this time.

STEEL-SERVICE PLANTS
AT: NEW YORK
BOSTON
PHILADELPHIA
CINCINNATI
CLEVELAND
DETROIT

PITTSBURGH
BUFFALO • CHICAGO
MILWAUKEE
ST. LOUIS
LOS ANGELES
SAN FRANCISCO

RYERSON STEEL

Metal-working plant holds rejects to 4% by stiff inspection

By James Joseph

THE DIFFERENCE between close, rigid inspection, with the inspection department completely divorced from production, and "just average" inspection methods, can cut rejects from 20 per cent to a low of 4 per cent. That's been the production experience of rivet manufacturer, the Cherry Rivet Co., Los Angeles.

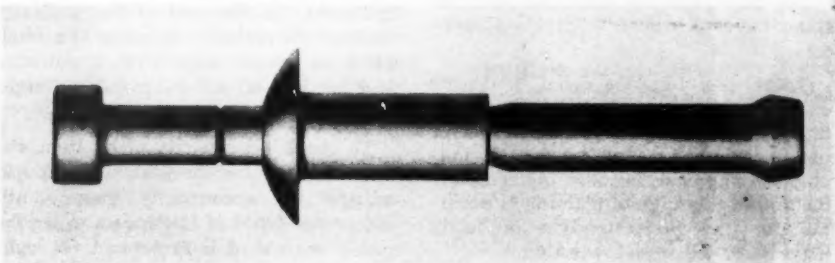
The company manufactures twenty million rivets a month, and because of their special "blind" fastener feature, each rivet must be drilled. In the heading department alone, trained inspectors, replacing inspection by machine operators, cut rejects from 15 per cent to just one per cent.

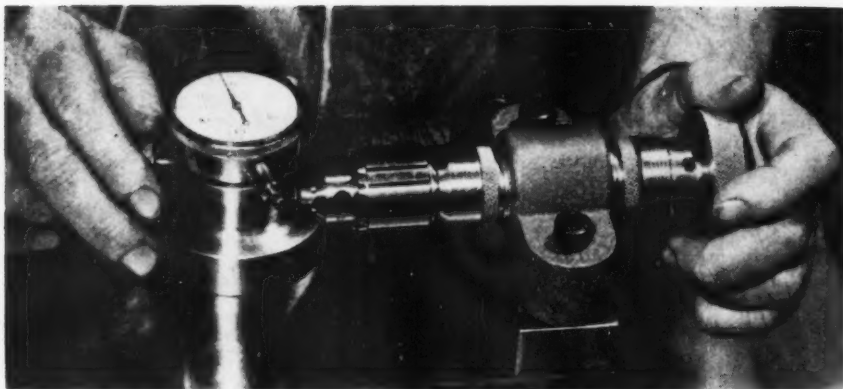
About 90 per cent of the rivets are

made from aluminum alloy wire, and the remainder from Monel, mild steel and brass wire whose diameters vary from 1/16 to 9/32-inch.

The rivet is a mechanized blind fastener. When a special pulling tool exerts a pulling action upon the stem and pressure on the rivet head, it draws the stem into the rivet, expanding the shank in the hole and forming a "tulip head" on the blind side of the work, figure 1. This metal-deforming action during installation is the critical factor in this otherwise simple product. For the rivets to perform satisfactorily, dimensions must be held constantly to tolerances of plus or minus .001-inch. In usual production runs, from 10,000

1. Cherry "blind rivet" . . . showing stem and rivet. It's an item which is precision made and carefully inspected.





2. Close up of the unique excentricity gauge. This is used in the heading department and checks rivets for roundness of the rivet head and its top-side flatness.

to 200,000 pieces (average: 60,000) are produced continuously.

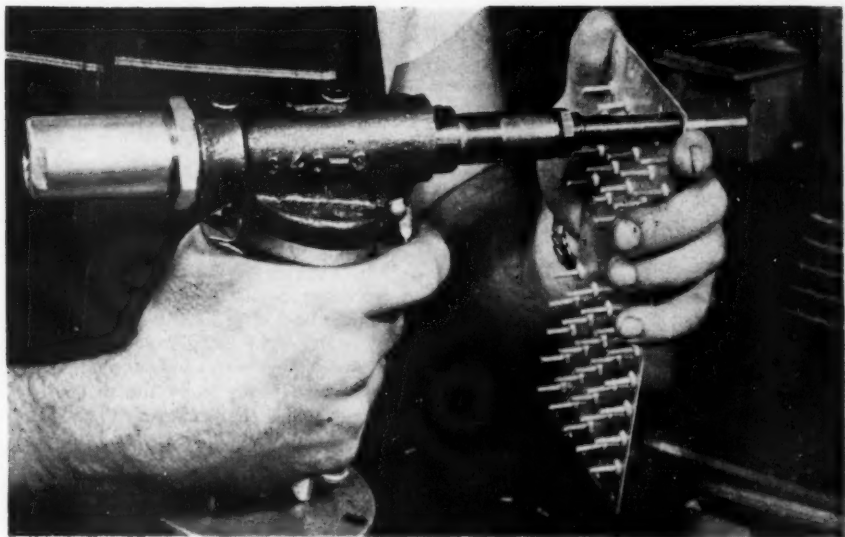
Until a few years ago, inspection was generally turned over to the operator on the job, with only the final inspection set-up as a separate function from production. By this final inspection method, whole lots had to be discarded at times, or sent back for reworking. It was then that Cherry set-up source inspection, completely separate from production. The Inspection Department, which today is on a managerial par with Production, reports directly to the general manager. Inspectors in each department have the authority, and use it, to shut down any production machine which is not turning out up-to-specification pieces. Before the machine may start up again, its operator must have clearance from the inspectors.

There has likewise been a drastic change in the type of chief inspector hired. Since 1946, the chief inspector has been either a metallurgical or mechanical engineer, because the company has found this type of training is essential for the understanding of fairly high-tolerance metal working.

Use special testing devices

In many cases, Cherry has improvised testing devices for its specialized use. Heading department inspectors, for instance, besides being equipped with normal inspection tools like micrometer calipers for measuring overall dimensions, and magnifying equipment for checking surface defects, have in addition, a unique adaptation of the excentricity gauge. This set-up checks for roundness of the rivet head or for its top-side flatness. The rivet is held in a Jacob's chuck, and is turnable by a knurled knob on a shaft held by a bearing which has been trued up to a total run-out of .001-inch. Mounted on a movable base, adjustable for height, is the excentricity gauge with its dial indicator. On the end of the indicator shaft of the excentricity gauge is a small piece of music wire with a rounded end which is silver-brazed at right angles to the shaft, figure 2.

To check excentricity of an item, the inspector mounts the part in the chuck, adjusts the excentricity gauge until either the bezel of the indicator or the music wire stud is in contact (at right



3. A sample of 50 rivets . . . from each lot is installed in an accurately-sized test plate. If two or more of the 50 rivets fail to install perfectly the entire lot is rejected.

angles) with the axis of the part under test. The inspector then turns the knurled knob, rotating the part, while he reads the dial of the gauge. This shop testing system works equally well to test for flatness of heads by moving the axis of the gauge parallel with the axis of the turning shaft.

Inspections are carried out after each production step: after the heading machine operation in which the basic rivet and stems are made; after heat-treating; after rivets are drilled; following anodizing (a 30-minute cycle in which baskets containing 7½-lbs. of rivets are run through two tanks of sulphuric acid); and finally, during and after assembly of stems and rivets.

Drilling inspection

The drilling operation is fully automatic, on special drill presses modified by the company, and still kept

under wraps. Two types of drill presses are used: single spindle for smaller lot runs; four spindle machines, with hydraulically driven turbines supplying the power, these for high production runs which warrant the set-up time involved. Single-spindle drills, turning out from 15 to 40 units a minute, and drilling holes ranging from .065 to .205-inches, I.D., keep within the .001 (plus or minus) tolerance. The four-spindle drills are cycled at 150-200 units a minute, the hole varying from .065 to .125-inch, I.D.

Inspection during and after drilling is essential because the drilling process can cause the shank to split. Three inspections are carried on during drilling with 4 per cent rejection shutting down the offending machine: (1) Special eccentricity jig to measure concentricity of hole just drilled in the shank; (2)



4. Line inspection . . . is continuing on the automatic machinery used in the final step of the manufacturing process.

5. The "split test" . . . is conducted on a hand press adapted with dies and mandrels to simulate installation conditions.



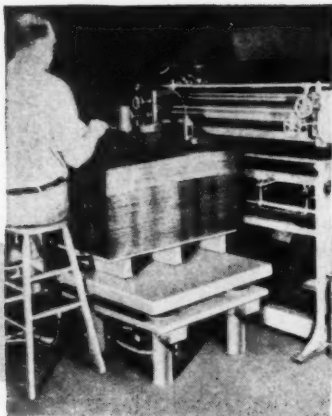
split test—which re-enacts actual installation of rivet to see how the head and stem stand-up under pressure; (3) visual test, using an 18-power binocular microscope to inspect for burrs and surface flaws on the hole wall.

In this set-up, the eccentricity gauge for inspection consists of various size spindles, ranging from No. 44 to No. 6 drill size and arranged spoke-like from a hub. Various rivets are threaded on the spindles, depending on their drilled-hole size, and the eccentricity gauge's bezel is brought in contact with the shank of the rivet, while the rivet is turned on the spindle by the inspector. This measures the eccentricity of the hole.

Probably one of the most exacting of inspections in any operation of its kind, is carried on in final inspection. Finished items are subjected to: (1) general appearance check; (2) dimensional inspection of the rivet and stem; (3) shear test; (4) performance upon application; (5) split test.

Sample testing

In the performance test, a sample of fifty rivets from each lot are installed in a test plate, figure 3. These test plates—made in a special shop solely devoted to their manufacture—have controlled sized holes and controlled material thickness for the particular rivet being checked. If more than two rivets do not install exactly, 100 more are tested. If the 4% figure is still exceeded, the entire lot is rejected. The importance of the test plate can't be over-emphasized, for the rivets must perform over the range of tolerances in hole size and material thickness recommended for their use. Thus, there's the need for rigid installation inspection in two categories: sheet thickness; and sheet hole size. Tolerances for test-plate holes are held to within .002-inch. Plates are inspected with as much care



Previous to installation of the automatic, self-leveling **Portelvator Pack-lifter**, the sheet feeding operation shown here was performed from a standard four-wheel floor truck. This involved stooping and lifting, and resulted in unused machine capacity. Application of **Portelvator** Material Positioning Equipment increased daily production to such extent that installations were made at 6 additional locations.

YOUR PROSPECT FOR COST REDUCTION IS

Excellent

Time after time after time, the application of **Portelvator** to material positioning at the machine has resulted in such savings that problems, which seemed to have only a remote relationship to the operation, have vanished. If you have one machining operation where mechanical material posi-

tioning can be applied, your prospect for cost reduction is excellent.

Write for information about the easiest way to replace brawn, your most expensive component. Ask for our free Bulletin No. P-503.



PORTELVATOR®

Portelvator is the registered name for the Handy Hamilton Portable Elevating Table. Standard models have lift capacities of 1,000 — 2,000 or 5,000 pounds, and lift travels to 58" above floor level. Lift is transmitted through worm, worm gear, and screw.

Lift principle removes all possibility of tipping, slipping or settling under the load. Modified designs, with various power applications and controls, are used throughout industry for lifting and leveling safely and "as planned".



as the actual metal product—which makes this a test within a test. See figures 4, 5 and 6.

An interesting adjunct to Inspection is the Company's salvage committee. Made up of the general manager, the production manager, the chief inspector, and a representative of the sales and service department, this committee meets daily. Their sole purpose: to discuss projects, what's to be done about them, and how to reprocess materials which don't meet specifications. The committee system has: (1) kept all affected departments in production constantly aware of the reject picture and (2) has gathered around one table several minds, each with a different viewpoint, thus aiding correction of difficulties encountered in production.

The rigid inspection system at Cherry is an example how one company boosted inspection to a par with production, and drastically sliced rejects. In fact, in one instance already cited,



6. The "push out" test . . . which forces the stem out of the installed rivet determines vibration and fatigue resistance.

rejects decreased from 15 per cent to just 1 per cent within two weeks after inspection was taken away from the machine operator and turned over to a specially-trained inspector.

The End

Preloaded Precision Bearings for Spindles



MOREY 12M
HIGH-SPEED
**VERTICAL
PROFILER
and MILLER**

Two spindle or single spindle

Speed and more speed in the production of interchangeable parts requiring milling of any contour or outline is yours in the MOREY 12M. Provision for increased clearance between spindles and table.

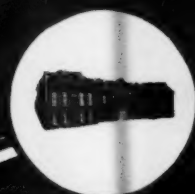
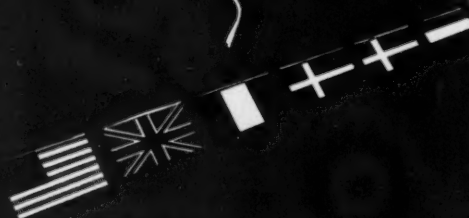
MOREY MACHINERY CO., INC.
410 Broome Street New York, N. Y.

Ready Tool establishes new repair service

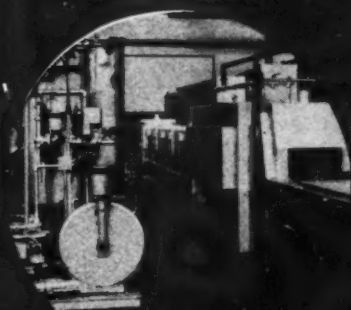
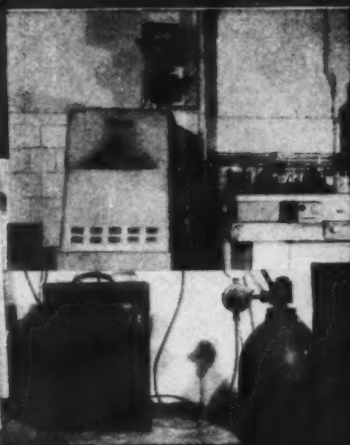
The Ready Tool Company, Bridgeport, Conn., manufacturers of Red-E Anti-Friction Bearing Centers has opened a Repair Service Department to help alleviate the situation caused by shortages of materials and parts, plus the demand for these precision centers.

With this new department, the company can accept all Red-E Centers for repair, regardless of age or condition. Each center is reground to its original accuracy, regreased for life and the bearings replaced with No. 5 A.B.C.E. specification bearings. They will be fully guaranteed. Centers beyond repair will have a trade-in value.

*Lindberg paroli universala lingvajo
kie ajn metalo estas fabrikid*



Lindberg . . . in any language means finer furnaces



Lindberg in foreign lands

Electric Resistance Furnace Co.
Waybridge, Surrey, England

Electric Furnace Co.
Waybridge, Surrey, England

Etablissements Jean Aube
Paris, France

Gerard Pluoger
Antwerp, Belgium, Laboratory Furnaces

Allmet Industries Pty., Ltd.
Sydney, Australia

A. Schunberth & Co.
Basle, Switzerland

Sabin St. Germain
Mexico, South America

Williams & Wilson
Quebec, Toronto, Montreal,
Windsor, Canada

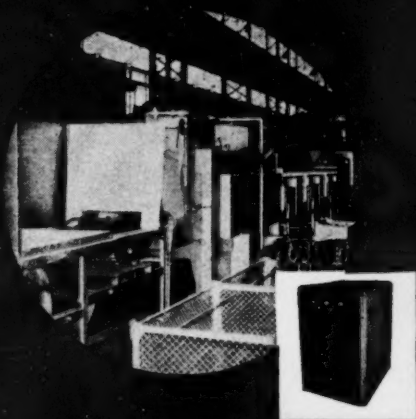
Lindberg Italiana
Milan, Italy

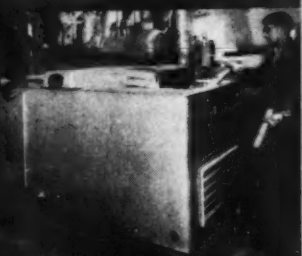
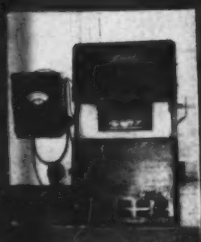
Impresa Progresso
Rio de Janeiro, Brazil, Laboratory Furnaces

Lutz Ferrando y Cia
Buenos Aires, Argentina

Ing. O. W. Berg & Co.
Helsingfors, Finland

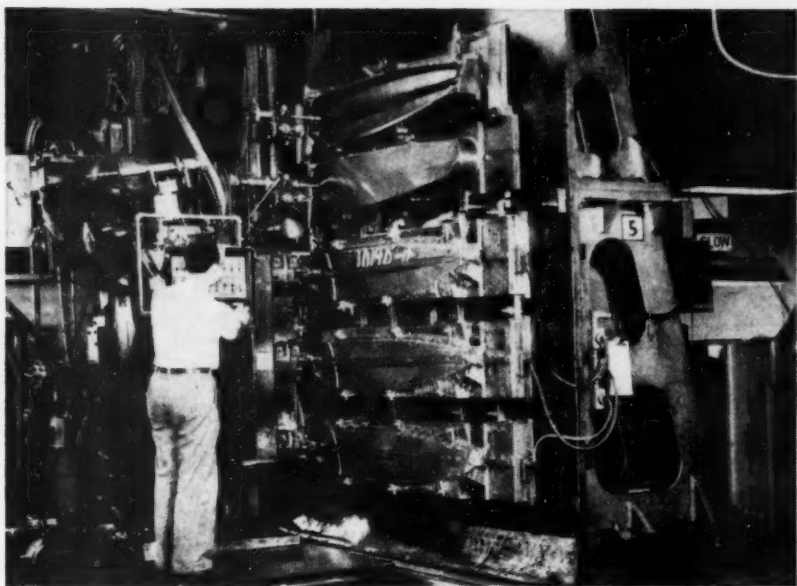
Axel Kistner
Stockholm, Sweden





Lindberg manufactures a complete line of industrial furnaces

Breaking Bottlenecks in Defense Industry

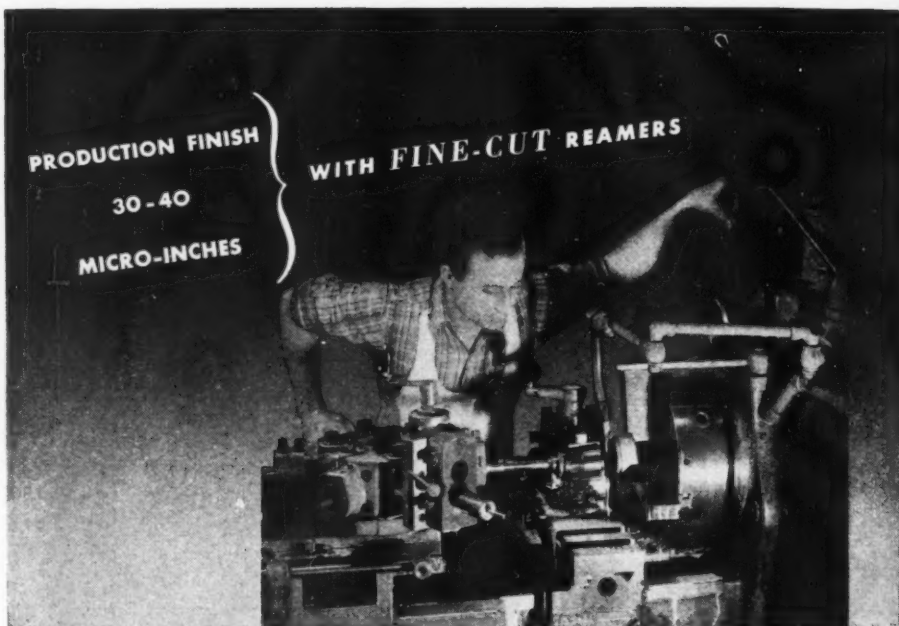


Aero Products Corporation, Dayton, Ohio,
uses Walker designed chuck installation
to meet high production schedules.
Walker does it again.

O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS


Original Designers and Builders of Magnetic Chucks




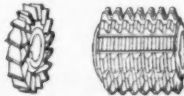
You can ream finishes like this in *regular production* operations with Barber-Colman Fine-Cut Reamers. Many jobs which previously required finishing by lapping or honing are now being finish reamed with these Fine-Cut reamers. All elements for fine finish, accuracy and tool life are provided in the reamer design and application of Barber-Colman job-engineered reamer sharpening.


With assurance of this built-in control, more pieces can be finish-reamed before breaking the set-up for re-sharpening. In addition, the Barber-Colman blade mounting design combines outstanding tool life with ease of blade adjustment and absolute rigidity. That's why you outproduce—and outearn—conventional tool designs every time with Barber-Colman reamers.



A Complete CUTTER ENGINEERING SERVICE to Solve Your Metal-Cutting Problems









JOB-ENGINEERED DESIGN • FULL LINE OF STANDARD TOOLS • FIELD SERVICE

Barber-Colman

FINE-CUT REAMERS

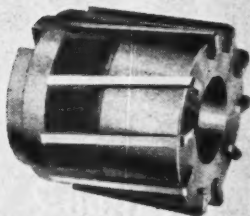
ONE-CUT FINISH REAM 30-40 MICRO-INCH FINISH, CUTTING 170 FEET PER MINUTE, USING .008"-.010" FEED

No special tooling is required to get results like these. A standard turret-lathe set-up is used. The large number of blades in the reamers provides extra stability in the cut and smaller chip load per tooth, resulting in a very fine finish.

From chamfer, secondary lead and back taper are specified for these particular job conditions by Barber-Colman Reamer Engineers to produce free-cutting and easy chip removal without scratching, back scoring or gouging.

If you are now choosing between accurate, quality-finish reamed holes—and low-cost production and reamer maintenance—you can have both, using Barber-Colman adjustable reamers. More blades per cutting diameter—blades solidly held in cutting position—Barber-Colman standard irregular blade spacing—these features produce tool room quality under production reaming conditions.

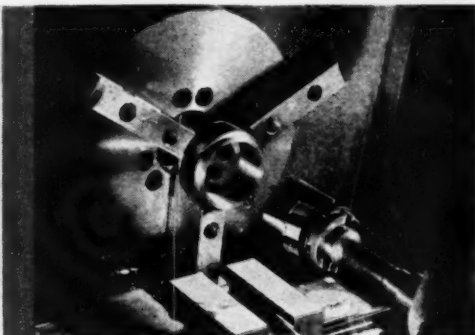
Send specifications on hole sizing and finishing problems to Barber-Colman engineers. They will furnish reamers to give you the desired quality consistently.



1. Reamer, held in turret lathe float, is fed to work revolving at 170 feet per minute, using .008"-.010" feed. Three thousandths stock is removed in a cut 2.88" diameter and 1-1/2" long.

2. Irregular spacing of ten reamer blades is arranged so that diameter size is easily checked across any two blades. Wedge mounting at bottom of blades permits more blades per reamer diameter—hence, finer finish.

3. Consistent 30-40 micro-inch finish is obtained on these precision boring head collars throughout the life of the reamer because of Barber-Colman job-engineered reamer sharpening.



Barber-Colman Company

GENERAL OFFICES AND PLANT, 811 DOUG STREET, BOSTON, ILLINOIS, U.S.A.



Feeling low about the steel situation ?

Let us try to help you! Very frequently our experience will suggest a way out of your particular steel supply difficulty. We may have substitute materials or know of ways to stretch the supply of steel available to you. Call us *first* when you have a steel problem.

UNITED STATES STEEL SUPPLY COMPANY

Warehouses Coast to Coast



BALTIMORE • BOSTON • CHICAGO • CLEVELAND • LOS ANGELES • MILWAUKEE • MOLINE, ILL. • NEWARK
PITTSBURGH • PORTLAND, ORE. • ST. LOUIS • TWIN CITY (ST. PAUL) • SAN FRANCISCO • SEATTLE

Sales Offices: INDIANAPOLIS • KANSAS CITY, MO. • PHILADELPHIA • PHOENIX
ROCKFORD, ILL. • SALT LAKE CITY • TOLEDO • TULSA • YOUNGSTOWN

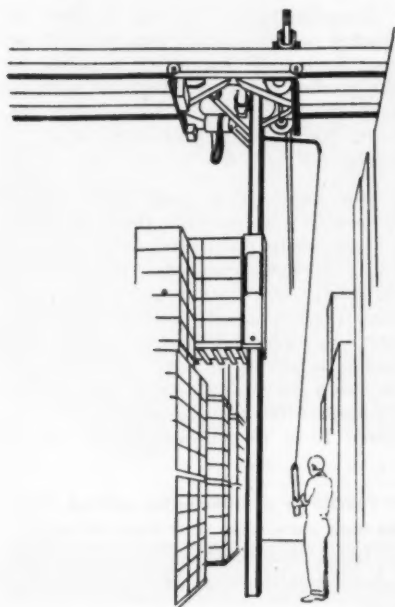
Headquarters Offices: 208 S. La Salle St.—Chicago 4, Ill.

UNITED STATES STEEL

Overhead tiering at du Pont using new stacker crane

By Fred A. Miller
E.I. du Pont de Nemours & Co.
Wilmington, Del.

The so-called "stacker crane," developed at du Pont, is an entirely new facility for materials handling. It is called a stacker crane because the stacking feature of the fork truck has simply been attached to the trolley of

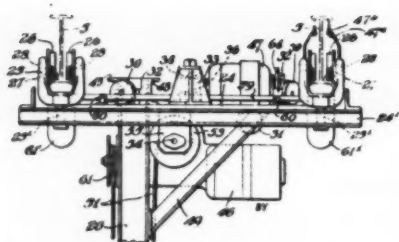


an overhead bridge crane. It was developed to maintain maximum storage capacity and, at the same time, to achieve the economies made possible by the fork truck and pallet system.

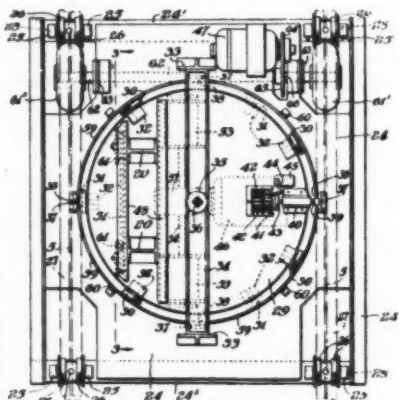
Realizing the need for new equipment to do this job, the du Pont Engineering Department devised and developed this scheme because no other type of available handling equipment studied would reduce this sacrifice of storage capacity. It was desired to develop a new method which essentially would retain the same inventories as obtained with hand stacking, or increase them.

To maintain minimum aisle widths, findings resulted in the theory that the mechanism must of necessity be suspended from above. Therefore, an overhead-supported rigid mast was devised, figure 1, with a pick-up to improve space utilization over that of the fork truck system by reducing aisle widths required. The mast is attached to the trolley of a conventional overhead bridge crane. The rigid mast, figure 2, is secured to a turntable built into the bed of the trolley. Figure 3 shows the

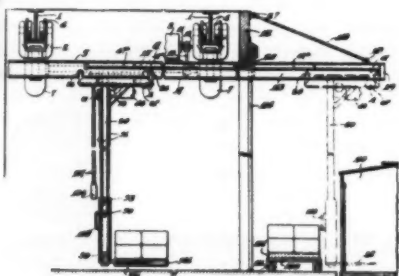
1. This overhead-supported rigid mast...
with pick-up improves space utilization.



2. Turntable . . . built into bed of trolley secures mast.



3. Plan view of turntable.



attachment in plan view. A hoisting carriage with any type load-engaging device completes the development.

In effect, the basic fork truck elements have been taken and suspended from the ceiling, eliminating the counterweight in the process. Figure 4 indicates the feasibility of transferring the pick-up stacking unit from one crane to another or, by a jib arrangement, carrying loads to and from the door of a box car or a truck.

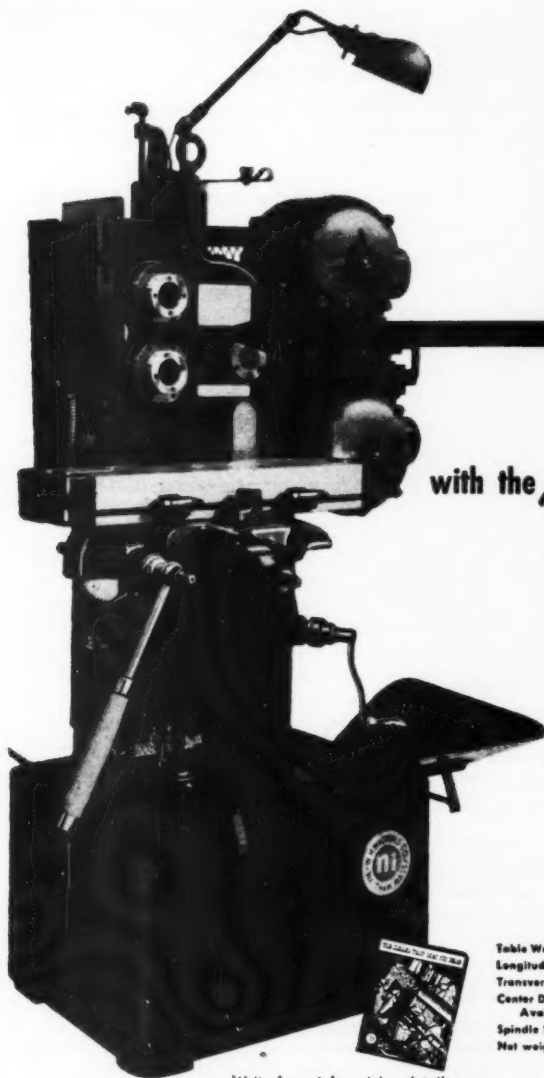
Maximum accessible storage capacity

This mechanical arrangement makes possible the maximum accessible storage capacity for a given area. The operating aisle width required is approximately the length of the load plus 18 in. In the case of a four-foot pallet, the aisle required is therefore five and one-half feet, figure 5.

Note in figures 5 and 6 that the shaded portion shown denotes a 52 per cent savings in the space required for the stacker crane as compared with the fork truck. For one-column-deep pattern, the storage space ratio is of the order of 9 to 13.65.

The fork truck and pallet system generally is accepted as the most economical means for storing raw materials and finished products. However, a standard 4000-pound capacity truck with 18-inch square pallets requires a 12- to 13-foot-wide operating aisle width, whereas manual stacking requires a five- to six-foot aisle width. Consequently, storage capacity is reduced 10 to 15 per cent by the use of

4. Feasibility of transferring pick-up stacking unit . . . from one crane to another or, by a jib arrangement, carrying loads to and from the door of a box car or a truck.



TWO FOR ONE

with the *Nichols* Double-Decker!

The Nichols "Double-Decker" Two-spindle Miller actually gives you two milling operations in one pass! It is equally adaptable to small or large lot production of small parts where parallel flats or grooves, or opposed faces cannot be straddle milled, or otherwise must be indexed for two operations with a single cutter. Its time-saving features are readily apparent. Spindles may be separated from 4" to 7" (or more) to accommodate various sizes of cutters and work. Table can be arranged for hand operation or with automatic work cycle, and with high or low spindle speeds.

CONDENSED SPECIFICATIONS

Table Working Surface	6 $\frac{1}{2}$ " x 21"
Longitudinal Travel	18"
Transverse Travel	7"
Center Distance of Spindles Available Between	3 $\frac{1}{2}$ " and 14 $\frac{1}{2}$ "
Spindle Speeds Available	up to 5000 R.P.M.
Net weight approx.	1250 lbs.

Inquiries must be submitted in detail, as specifications and capacities are governed by user's needs.

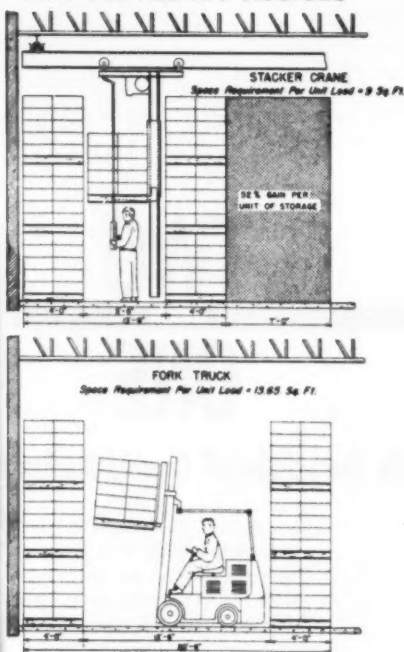
Write for catalog giving details on lever, screw and air-feed models, plus three types of double spindle Nichols Millers.

MANUFACTURED BY W. H. NICHOLS COMPANY WALTHAM, MASSACHUSETTS

NATIONAL DISTRIBUTORS **NICHOLS-MORRIS CORPORATION**

59-G CHURCH ST.
NEW YORK 7, N. Y.

GREATER SPACE UTILIZATION OF STACKER CRANE



the fork truck. Increased investment cost also is experienced in planning new storage areas, since the additional aisle space for fork truck operations must be provided at the prevailing cost of 75 cents to one dollar per cubic foot for building construction.

To date, fourteen stacker crane installations are in operation or will be completed in the next few months. The units are employed in the following ser-

5, and 6. Showing greater space utilization of the stacker crane.

vice as tabulated:

All of the installations shown are or will be in du Pont plants except the last one noted.

Save 60% in handling 1000-lb. rolls

The two stacker cranes, figure 7, listed in the first item were installed in a new cellophane plant for storing 1000-lb rolls, on the basis of lower investment cost as compared with any previous system operating in older plants. A subsequent check of cost sheets showed that the new system was handling 1000-lb rolls at a savings of 60 per cent, as compared with the performance of the next best system. The two cranes listed as Item 3 were installed during a subsequent plant expansion after several years of satisfactory operation of the original pair. The roll-handling cranes listed as Item 5 were installed in another cellophane plant on the same basis. These results are accomplished by the fact that all necessary motions for storing rolls are motorized and operate by pushbutton from a single level. The only difference incorporated in these cranes is the substitution of a motorized roll core-engaging mechanism on the lifting carriage in place of the usual fork pick-ups, figures 8, 9, and 10. It should be noted that rolls are stored to a height of 14 ft with perfect safety. Since all major motions are pushbutton.

Stacker Units in Service or Being Installed

Item 1	—	2	—	1000 lb.	stacker cranes storing rolls
Item 2	—	1	—	3000 lb.	stacker cranes storing pallet loads
Item 3	—	2	—	1000 lb.	stacker cranes storing rolls
Item 4	—	1	—	4000 lb.	stacker cranes storing skid loads
Item 5	—	2	—	1000 lb.	stacker cranes storing rolls
Item 6	—	1	—	1000 lb.	stacker cranes storing pallet loads
Item 7	—	2	—	500 lb.	stacker cranes storing drums
Item 8	—	3	—	3000 lb.	stacker cranes storing pallet loads

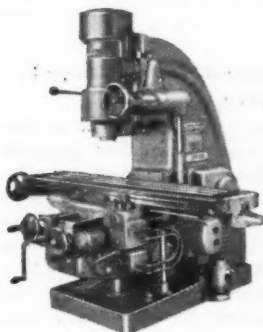
14 Total



The Addition of Vertical Style Milling Machines to the New

KEARNEY & TRECKER
MILWAUKEE

CK Line



Kearney & Trecker's new CK line of Knee-Type Milling Machines is complete with Plain, Universal and now — Vertical styles. These new Vertical CK's have every feature of the CK line. Features that are job and test-proven — designed to fill today's immediate needs — and to meet your tomorrow's milling requirements. You'll find they have all the new CK cost-cutting advantages — Greater Rigidity, Greater Horsepower, Greater Cutting Efficiency, Greater Productivity, Greater Versatility, Smoother

Feed Performance and Greater Machine Life. If you need a new vertical style knee-type mill—don't fail to investigate these new CK's. For without reservation, the new CK line of knee-type milling machines — Plain, Universal and Vertical — are the finest Kearney & Trecker has ever offered to the metalworking industry. Your choice of five sizes — 10 hp No. 2, 15 hp No. 3, and 25 hp Nos. 4, 5 and 6. Kearney & Trecker Corp., 6784 West National Avenue, Milwaukee 14, Wisconsin.

REPLACEMENT OF OBSOLETE MACHINE TOOLS
IS AN INVESTMENT THAT MAKES BOTH DOLLARS AND SENSE

KEARNEY & TRECKER
MILWAUKEE
MACHINE TOOLS





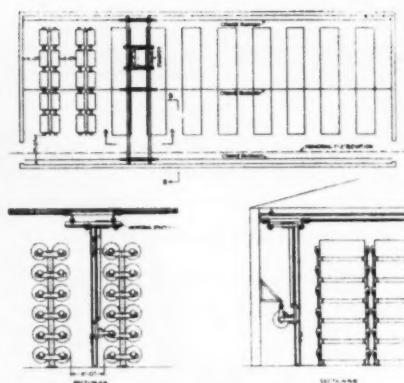
**NO STOPPING
NO KEYS
NO WRENCHES
NO PRODUCTION
DELAYS**

Meet sudden demands for high speed production by having every lathe equipped with the Allison Collet Chuck. Gives full spindle bore capacity to any lathe having $1\frac{1}{2}$ "-8 thread spindles. Requires no keys, wrenches, reverse switching or stopping. Operator simply draws lever ball toward him to tighten collet; pushes it away from him to release. Mail the coupon for complete, illustrated description and prices.

ALLISON CHUCK PRODUCTS
2003 South Mesa Street
San Pedro, California

Please send catalog page, prices and name of nearest supply house.

NAME _____
ADDRESS _____
CITY _____ STATE _____



7. Schematic diagram of stacker crane for cellophane plant.

actuated, it is possible to use female operators, figure 11, as was found necessary during the war when our available industrial manpower had more important duties.

The stacker crane in Item 2, figure 12, is in operation in a yarn plant, and was justified on the basis of a 58 per cent increase in storage capacity in an existing building. If fork trucks were used with the usual wide aisles, it would have been necessary to increase the storage area by approximately 180,000 cu ft of building construction.

Eliminate need for enlarged shipping area

The stacking crane noted for storing 4000-lb skid loads of finished products was approved on the basis of eliminating the need for doubling the size of the shipping area, which would have amounted to approximately 200,000 cu ft of additional building construction. The increase in storage capacity was gained by storing the skid loads two-high, the upper layer by stacker crane on steel racks—operating in the same aisle width (approximately six feet) required with hand jack truck operation for placing the lower layer. As the

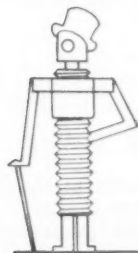
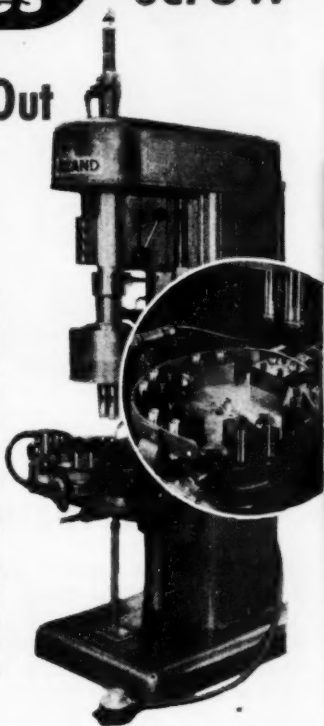
CLEVELAND tapping machines

lead
screw

CLEVELAND Tapper Turns Out Two 20 MM Shells Every 6.1 Seconds

Operating at 100% efficiency, the CLEVELAND Tapper we designed for munition makers taps two 20 MM shells per machine stroke at the rate of 1180 pieces per hour. It uses a stroke of $\frac{1}{2}$ " cutting at a spindle speed of 420 RPM at 68 SFM with a tapping cycle of 36 turns or 5.1 seconds plus 1.0 second for the table index, making a total work cycle of 6.1 seconds for the two shells.

Other CLEVELAND models are producing such vital defense items as 3.5 rocket bodies . . . 90 MM shells. In many plants throughout this country and abroad CLEVELAND Tappers are reducing production costs and saving priceless man hours. A semi-skilled worker equipped with a CLEVELAND Tapper engineered to the job becomes a skilled operator.



CHECK WITH CLEVELAND FIRST if you need to perform any of these operations: Tapping . . . Threading . . . Drilling . . . Spot-facing . . . Reaming . . . Chamfering. Cleveland engineers can help you with your problem, show you how to effect economies in these operations.

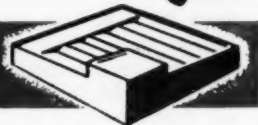
Mr. Lead Screw says:

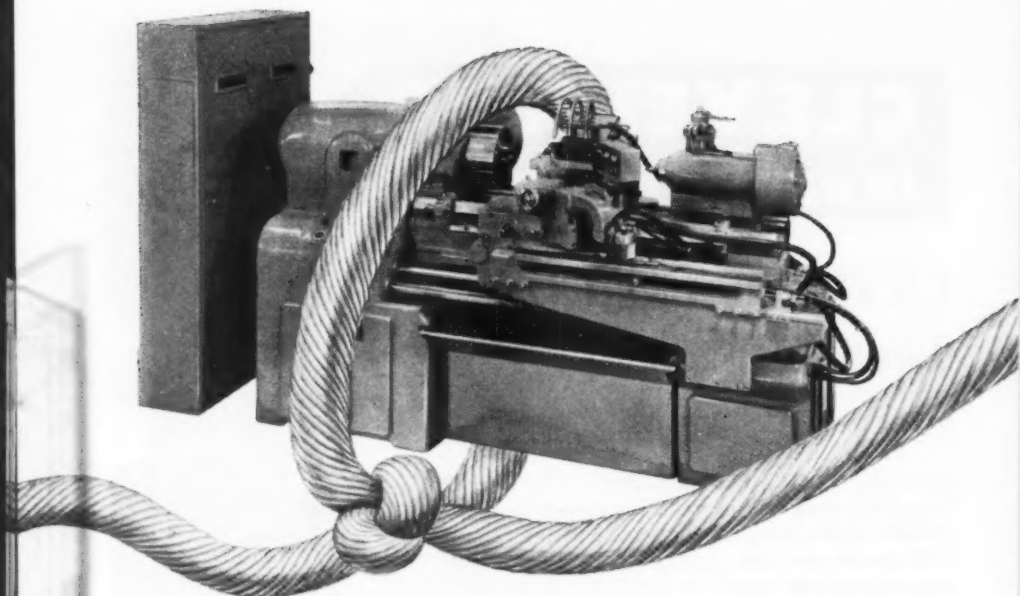
Write today for your copy of the Cleveland Production Tapping Guide and a copy of Catalog MB-3.



THE CLEVELAND TAPPING MACHINE CO.

A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC.
CANTON 6, OHIO





90% SAVINGS.

Here it is in a nutshell, fresh from the Monarch Mona-Matic installation at the Sargent Engineering Corporation of Huntington Park, California. The part is a fork 6" x 2" OD, made from a 4130 chrome-moly

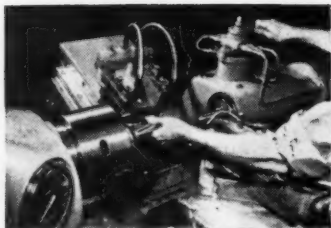
forging heat treated to a hardness of 125,000-145,000 psi before machining — "a tough machining problem from the beginning." Now, look what happened to the production time when the Mona-Matic went to work:

THEN		OPERATION	NOW
Turret Lathe	30 min.	Rough Cut	Mona-Matic 5 min.
Engine Lathe	10 min.	Semi-Finish Cut	
Grinder	10 min.	Finish	
3 Machines	50 min.		1 Machine 5 min.

That makes a 90% reduction in machining time alone, and it's just the start! Set-up time for the job has shrunk from more than 3 hrs. to less than 20 min. One machine has replaced three. Only one operator is required (and he could easily handle two Mona-Matics if necessary). Add all that up—and is there anything

more that we have to add to it?

What is this machine that consistently turns out production savings like this on short runs and long ones alike? That's where the string on the story comes in! Aren't you convinced that you'd better return our handy coupon right now? . . . *The Monarch Machine Tool Co., Sidney, Ohio.*



THE MONARCH MONA-MATIC (Main Illustration and Above, with Work Piece). This is a new and outstandingly successful approach to production metal turning. Use of a single tracer-controlled running tool speeds production, slashes tool costs, tool change time and set-up time, increases accuracy, and slashes time required for subsequent grinding operations. Available with magazine load.

• with a String Attached!



FOR A GOOD TURN FASTER...TURN TO MONARCH

THE MONARCH MACHINE TOOL COMPANY, Sidney, Ohio

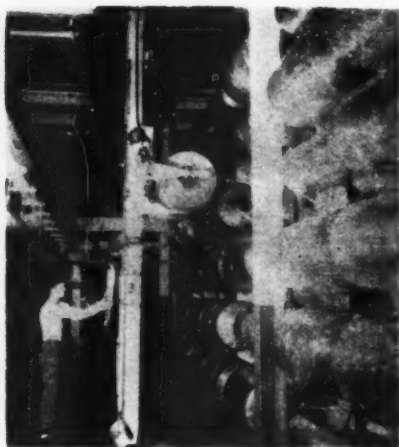
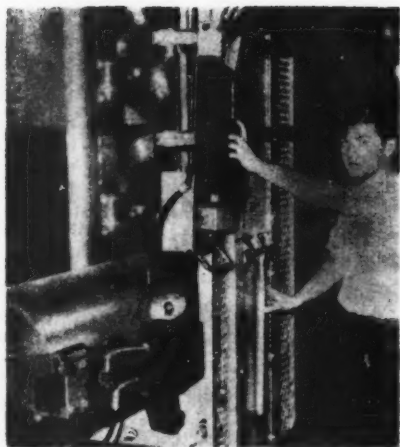
Gentlemen: I am interested in your Mona-Matic story and would like to receive your illustrated Booklet, with complete data and job performance reports. Please send me your Booklet 1804 without obligation.

NAME _____ TITLE _____

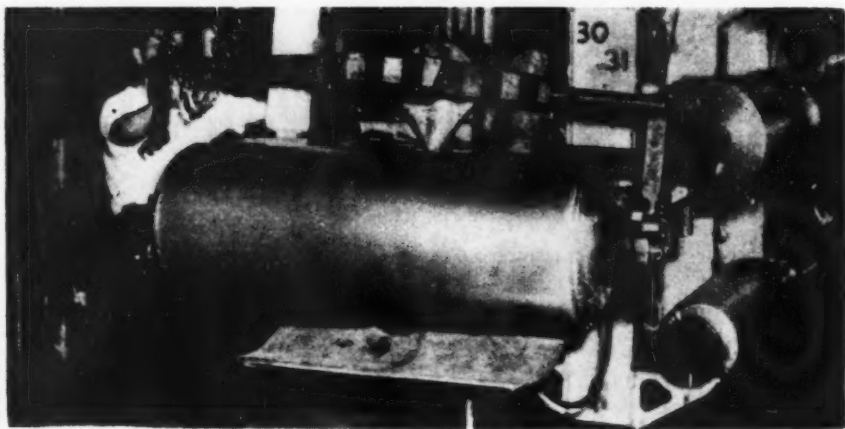
COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____



8, 9 and 10. Roll-handling cranes installed in cellophane plant, showing motorized roll core-engaging mechanism on the lifting carriage in place of the usual fork pick-ups.



maximum loads approach 4000 lb, figure 13, all motions—including the rotation of the mast—are motorized and controlled from a pushbutton station at floor level. It should be noted here, however, that this operation is not one of storage alone; a high-turnover shipping proposition of more than several hundred units per day is involved.

Item 6 was installed in a modernization program at one of the du Pont Photo Products plants, where it more than doubled the storage capacity in one of the existing buildings. In figures 14, 15 and 16, note that the stacker crane used has a rigid non-rotating mast, and that the pick-up carriage is rotated at any elevation to the desired direction for storing the load in multideck steel racks.

Production Pointers

TIME
SAVING
IDEAS

from

GISHOLT



Why Gisholt's Recommendations Are Unbiased—In helping you solve your turning problems, Gisholt engineers have no reason to favor one type of machine over another except on the basis of its ability to best serve your needs. For Gisholt manufactures both manually operated turret lathes and automatic lathes.

FASTERMATIC KEEPS 8 CUTTING TOOLS BUSY TO TURN OUT FORGED PARTS IN A HURRY

Job Requires Rough, Finish Machining on All Surfaces

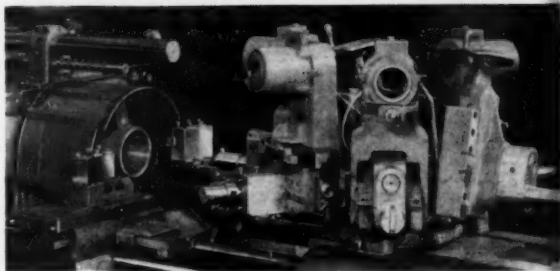
The trick here was to turn these steel forgings into top slips for oil well equipment in the fastest, lowest cost way. The nature of the cuts—both straight and taper bores... facing... inside deep grooving... and two chamfers—indicated that the 2F Fastermatic Automatic Turret Lathe was a "natural" for the job.

All this work, both rough and finish machining, calls for all six hexagon turret faces, and the individual front and rear cross slides... 8 tool approaches to the work.

The operation starts with rough boring of the ID from first turret station. At the same time, the front cross slide roughs faces. Next, the rest of the ID is rough tapered by a slide tool mounted on the second turret station and which is guided by a cam on the rear cross slide.

Maximum Use of Tools

Indexing to the third turret station, the straight bore is finished, while finish facing is handled by the rear cross slide. Rough grooving in the straight bore follows. A standard grooving tool on turret station four reaches in for this deep operation. This tool is actuated by a stop on the headstock which causes it to feed to depth while the turret feeds forward.



Tooled up to turn out 5" top slips, this Fastermatic keeps 8 tool stations working at top efficiency.



At right the rough forging. Center view shows taper end after machining. At left is the same part reversed.

At station five, tools finish the taper bore and chamfer the inner edge. Ending the job, a grooving tool at station six finish grooves and makes a small bevel in the inner groove. Time? Only 5.5 minutes, floor-to-floor—with the machine's automatic cycle allowing the operator to handle other work on a second Fastermatic. It's another example of how the

flexible standard tooling and automatic speed and feed changes make the Fastermatic ideal for high efficiency output where a variety of diameters and straight and angular surfaces are machined.

With all tool stations working, the Fastermatic performs all rough and finish facing, straight and angular boring, and grooving operations on these parts in a single chucking.

FOR MORE PRODUCTION FROM

A CLEAR-CUT CASE FOR RUGGED DESIGN

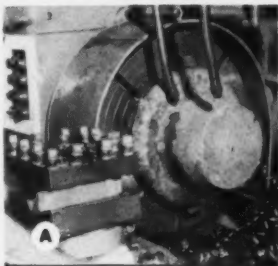
New Saddle Type Turret Lathe Cuts Time $\frac{2}{3}$

If you want convincing evidence of what rigidity and pulling power can do to costs, this is it.

This manufacturer formerly machined these 12½" mild steel forged companion flanges on an older type machine. Production was one part per hour; only one cut at a time could be taken. Now, with the job on a Gisholt 3L Saddle Type Turret Lathe, 3 parts are finished in the same time. The big difference lies in sheer power and rigidity.

The part is chucked on the large OD. Tools in a multiple turning head simultaneously rough the OD and ID of the body. Finishing is handled in the same manner from the second turret station. Tools on the quick indexing square turret do the facing, chamfering and radius while the hexagon turret is working.

On the turning cut a 1¼"



Simple as A B C, hiking production $\frac{2}{3}$ by use of the right lathe. "A" photo shows forged part chucked. "B" photo, simultaneous machining by hexagon turret and square turret. "C", the completed part—20 minutes later.

carbide tool bit removes up to 1¼" on the side with a .019" feed. That's a sizable hunk of metal, removed without chatter. This overhanging tool provides physical proof of machine's ability to take all the tools can stand.

Simply by putting this job on a rigid, powerful Saddle Type Turret Lathe with multiple tooling, output was increased two-thirds.

THIS KIND OF PLANNING PAYS OFF

With Proper Tooling Ram Type Lathe Handles 6 Different Parts for One Assembly

Careful planning pays off on any job, of course. But here's an outstanding example of it—for machining six different parts of the same assembly—where precision is required but quantity doesn't warrant a high production setup.

Tooling is smartly planned for the Gisholt No. 4 Ram Type Turret Lathe so there is fast changeover for handling all the pieces. The air chuck with special fixtures is quickly adapted for both internal and external holding.

External work and facing are done by tools on the quick indexing square turret on the cross slide carriage. These handle precision machining

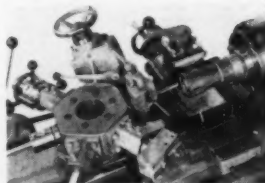


The internal machining of these six different parts for one assembly is all handled by this one group of tools (right) on the hexagon turret.

on all six of the parts.

Yes, well planned tooling can solve production problems. Good reason why you should check with Gisholt for the tools that can help cut your machining time and costs. Ask about them.

The machining of six different parts is planned around one set of tools. This user is time and money ahead.



One of the parts set up in the No. 4 Ram Type Turret Lathe.



MAN-HOURS AND MACHINES

TIME
SAVING
IDEAS



PARTS GET QUICK TRIMMING (36 LBS. OF METAL)

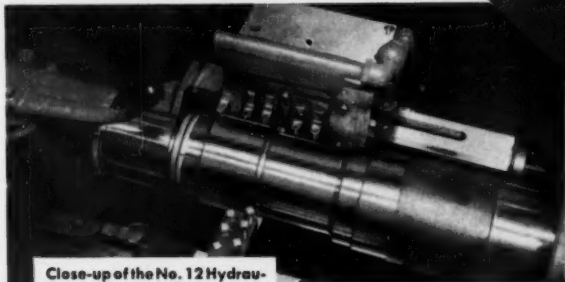
BY NO. 12 HYDRAULIC

4 Tools Team Up to Make Deep Cut on Same Surface

Here's a way to hog off metal with real finesse—the way this No. 12 Hydraulic Automatic Lathe brings parts down 36 lbs. to size. There is too much depth of stock on these 7½" N.E. 8640 cylinders for one tool to remove in a single pass, so the job is divided among four tools.

Tools are mounted in individual cam controlled sliding tool blocks on the longitudinally feeding front carriage. As each tool reaches the position shown by the first tool (see drawing), it is cammed inward to follow the required contour. Since the tools are successive, they follow the depth lines shown in the drawing. The fifth tool finishes the large OD at the right end, and the single tool on the rear carriage forms the right radius.

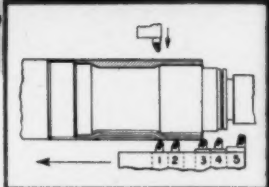
Floor-to-floor time is 8 minutes. Because tool load is



Close-up of the No. 12 Hydraulic job, showing the four tools on the front carriage which remove 36 lbs. of metal.

moderate by successive cutting, tool life is excellent. Also, operator handles another No. 12 Hydraulic which does other end of cylinders. Get new No. 12 Hydraulic Booklet.

In four successive contour cuts, with cam-controlled slides, this No. 12 Hydraulic brings cylinders down to size in one automatic operation.



The shaded area at top shows total metal removed by successive cuts from tools 1, 2, 3, 4 at bottom. Fifth tool finishes large OD at right of cylinder.

FRONT, BACK AND INSIDE OF HEAVY PIPE FLANGES MACHINED AT SAME TIME

Entire Job Done in Single Chucking

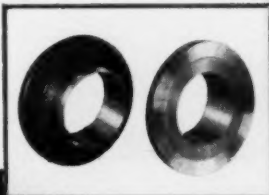
Note this efficient setup for machining heavy duty steel pipe flanges on a Simplimatic Automatic Lathe. See how it's planned for simultaneous machining of all surfaces—front, back and inside?

The part is held on the hub with a special fixture. Piloted tools on the center slide rough and finish bore and chamfer. The two back tools, which are operated through the spindle, face and chamfer the neck. Tools on the front and rear slides rough and finish the two flange steps.

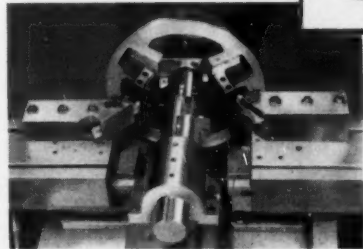
All cuts are simultaneous—with the 8" pipe flanges being finished in one operation at a

rate of one part every 3.7 minutes, floor-to-floor.

This manufacturer profits from the adaptability of the Simplimatic by rough and finish machining all surfaces of these pipe flanges in one quick operation.



Finished 8" pipe flange



This tool planning you see here enables this manufacturer to machine both ends and inside of flanges at same time.





TIME
SAVING
IDEAS

**Unbalance
Located and
Measured;
Correction
and Re-check Made
on Balancer**

There's mighty slim chance for noise, vibration and excessive bearing wear in the large blowers which The Trane Company, La Crosse, Wisconsin, fabricates for its air-conditioning systems. Precision balancing on Gisholt Balancing Machines does away with these hazards.

The large blowers, in sizes up to 60" and weighing up to 3 tons, are balanced on the Type 6UH machine shown here. Balancing is done right on their installation shafts—with the work supports quickly adjustable to each shaft length by movement along

LARGE BLOWERS STAY QUIET, LAST LONGER THROUGH PRECISION BALANCING



This Gisholt Type 6UH Balancer locates and measures unbalance in various size blowers

the track set in the floor.

In operation, each unit of unbalance shown on the amount meter equals 0.1 oz. of correction weight. There's no computing necessary on the part of the operator . . . he merely reads the amount of required correction. When the amount and location of unbalance are determined, steel correction washers are welded at the indicated points

**Design for Balancing
Covered in Gisholt
Balancing School**

How to design rotating parts for fast, economical balancing is just one of the broad range of subjects covered fully in the Gisholt Balancing School. New classes start Nov. 5th and Dec. 3rd. Write for information.

and the part is checked for accuracy of balance.

This entire blower balancing job is handled in one operation and by one machine in fast time.



IT'S A BIG ADVANTAGE FOR THESE LITTLE CRANKSHAFTS

Two Superfinishers Quickly Handle All Bearing Surfaces

Because these outboard motor crankshafts seem peanut size compared to the others you know, you may think Superfinish is unnecessary. But, this manufacturer knows it's just as vital for better performance and long-

er life as for big-brother crankshafts in automotive and locomotive engines.

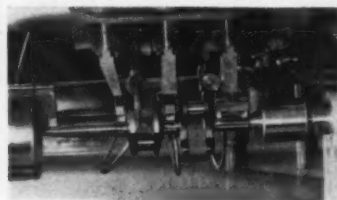
The r.p.m.'s of these little two-throw crankshafts are very high, and the bearing loads are severe. To Superfinish both the crankpin bearings and main bearings, two Superfinishers are used. The benefits are many—removal

of grinding chatter marks . . . simplified grinding and lower grinding wheel costs . . . improved geometry . . . and simplified assembly because the resultant "base metal" needs no break-in tolerance.

Does Superfinishing add to production time and costs? Not a penny . . . there are 25 hours per thousand crankshafts for grinding time and the same for Superfinishing. That's actually a 35% improvement over the former rough and finish grinding time. And the job is far better.

Write for booklet, *Wear and Surface Finish*.

Machine with 3 Superfinishing stones for handling crankshaft bearing surfaces.



This second Superfinisher does the crankpin bearings.



No. 1051
577A



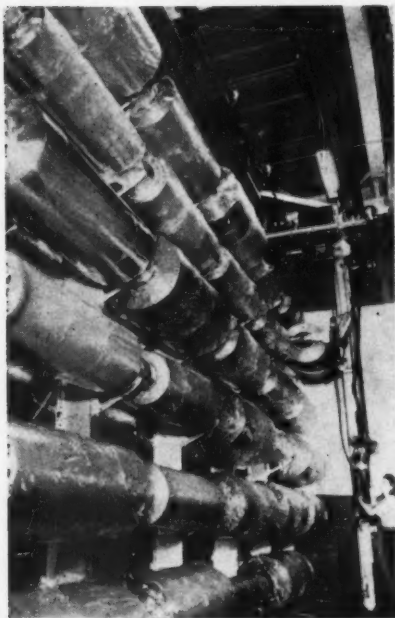
The Gisholt Round Table represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY

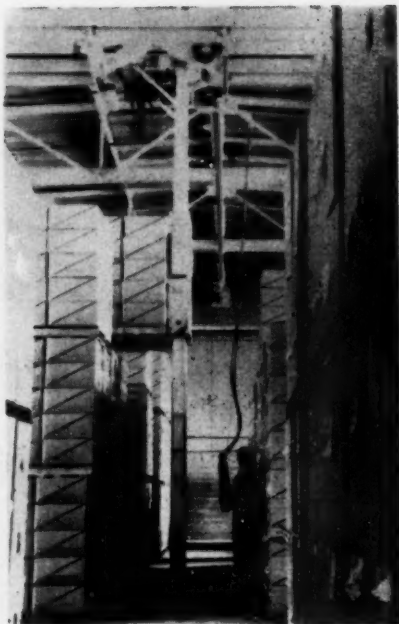
MADISON 10, WISCONSIN

A general catalog on machines listed below is available on request.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



11. Female operator . . . stacking cellophane rolls to a height of 14 feet with perfect safety.



12. Stacker crane in operation in a yarn plant.

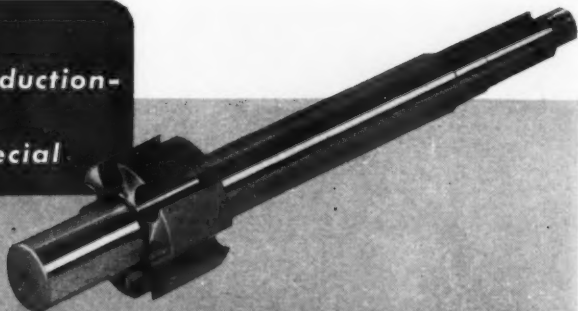
Reduce building size 42%

The architects retained to design the new du Pont Experimental Station buildings near Wilmington submitted a proposed layout for solvent drum storage. Since any one of the five hundred units stored must be available without shifting others, the drums were placed on end and arranged in double rows with an operating aisle between. In the original design, consideration was given to a conventional method of storing which did not utilize the space most economically. The result was that in

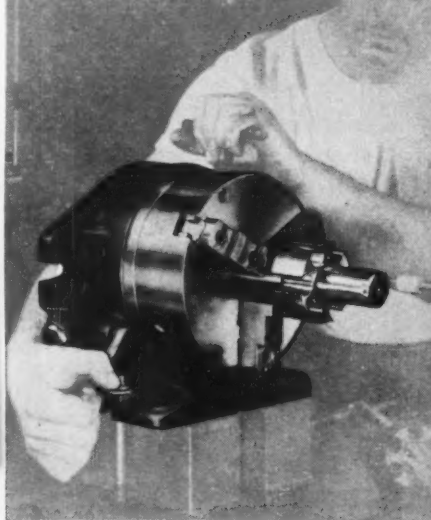


13. As maximum loads approach 4000 pounds . . . all motions are controlled from a pushbutton station at floor level.

When it
comes to production—
come to
Hartford Special



This part finished **60% FASTER** with a **SUPER-SPACER**



This spindle required the grinding, after hardening, of six equally spaced 1" holes. Formerly it was mounted in a V-block and holes were positioned by use of indicators and size blocks.

Production time was cut 60% when the same part was held in a Super-Spacer which provided precision indexing and instant hole location. Result, better, faster grinding at less cost per piece.

This production tool can help you, too! Write for information now.

Hartford Special also makes
these production machines



**AUTOMATIC DRILLING
& TAPPING MACHINES**



Automatic THREAD ROLLERS

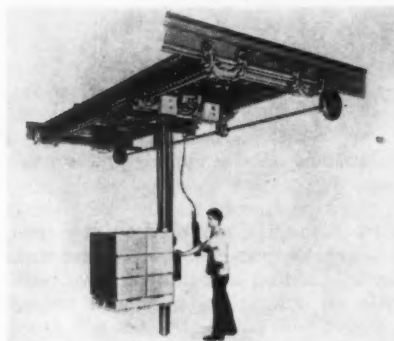


DIE POLISHERS

HARTFORD

Special

THE HARTFORD SPECIAL MACHINERY CO.
HARTFORD 12, CONNECTICUT



14, 15 and 16. Stacker crane has rigid, non-rotating mast. . . . Pick-up carriage is rotated at any elevation to the desired direction for storing the load.

this first design a building 170-ft long and 60-ft wide was required. An analysis by du Pont materials handling consultants using special storage racks and a stacker crane, indicated that a 42 per cent reduction in building size could be realized. This reduction not only paid for this equipment, but showed a substantial savings in investment dollars. Here again, figure 17, the stacker crane proved to be the most economical medium for efficient selective storage. Incidentally, a proportionate reduction is effected in the ventilating system necessary to remove hazardous solvent vapor from this building.

Commercially available "spark-proof" fork trucks are prohibited from operating in solvent vapor-laden areas. The lack of explosion-proof truck equipment is recognized, and has prevented consideration of mechanizing the handling operations in all such areas.

Both the storage and dispensing area stacker cranes shown in Item 7 are of explosion-proof construction. All motors, controllers, cable reels, and electric wiring meet the National Board of Fire Underwriters' Class I Group D specifications. Therefore, this feature of the stacker crane should be of particular interest to engineers in other industries where mechanization of handling operations has been restricted by the presence of highly combustible materials. With the stacker crane, palletized and other forms of unit load storage are entirely feasible. Flow of materials to and from the hazardous area can be handled by conveyors or by hand lift trucks.

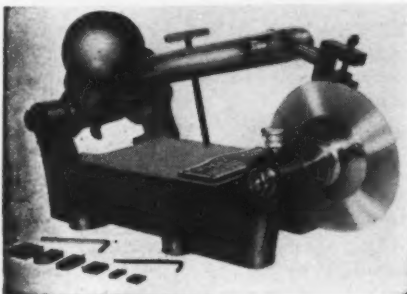
The three stacker cranes noted in Item 8 of the tabulation have been purchased by a large outside company. They will be employed in a selective storage service to stack jet engines on pallets in steel racks. Here again, better space utilization more than justifies the cost of the installation.

Although the rigid mast stacker,

Carbide Users

CAN NOW RESTORE BROKEN TOOLS AND CUTTERS QUICKLY AND INEXPENSIVELY WITH THE NEW IMPROVED MODEL NO. 300.

UNION CUT-OFF MACHINE



WHAT IT DOES:

Cuts broken sections off damaged carbide tools without grinding.

Cuts standard carbide blanks to any desired size.

Saves time-consuming grinding on carbide tools.

Saves carbide tools that otherwise would be scrapped.

Saves you money on costly diamond grinding wheels.

Saves you money by making possible the purchase of large-size standard carbide blanks.

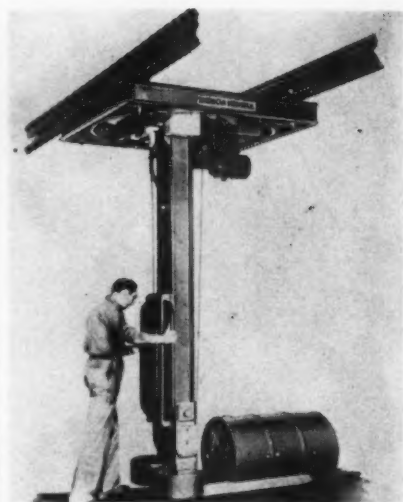
Simple to operate and automatic in operation.

SPECIFICATIONS:

1/4 H.P. motor, 1725 R.P.M. 110 Volt. Overall size 7" x 12" x 8" high. Supplied complete with diamond cut-off blade and motor for \$275.00 F.O.B. Stamford, Connecticut

LITERATURE ON REQUEST

UNION
WIRE DIE CORP.
71 W. 45TH ST., NEW YORK 19, N. Y.
PLANT: STAMFORD, CONNECTICUT



17. Handling solvent drums with stacker crane.

figure 1, may be mounted on any type of overhead crane or double monorail carrier, existing installations have been made on underslung monorail cranes equipped with rubber tire traction drive units. This drive is most desirable for warehousing operations, because an error in maneuvering the load merely results in tire slippage instead of damaged merchandise! The bridge and trolley drives readily are adjusted to provide sufficient traction for normal movement, but insufficient to push over a stack.

Another desirable feature of the stacker crane is its increased stability when high tiering or stacking is necessary. This greater safety is not possible with fork trucks that become rather unstable when working at elevated heights. It should be noted that stacker crane stability is not dependent on floor conditions.

Head-room requirements

The question of additional head-room requirements for stacker crane installa-

tions and the load effect on present steel building structures is anticipated. The answer to that is this: The overhead clearance for runway, crane, and stacker unit will range from 21 to 47 in. depending on capacity and span. This distance normally is required for spread of sprinkler heads and diffusion of the lighting, and therefore little, if any, additional building cost is involved. However, in special cases additional height may be required—if so, the cost of providing several feet of side wall construction is much lower than providing additional floor and roof construction. Actually, alterations of this type were required on several of the installations noted and, costwise, still resulted in justifiable projects. The load effect imposed on present building structures by stacker cranes is best answered by the fact that eight of fourteen cranes tabulated were installed in present buildings without any change in the steel structure. In most cases the crane bridge is a self-supporting beam, and therefore imposes a direct shear load on the building columns.

To derive further benefits from the efficiency and economy of the stacker crane, present and future planning includes studies in other plants where many especially difficult handling problems have been recognized and have resisted solution for years. There are numerous plants where considerable stores of miscellaneous and maintenance items must be stocked for constant demand. These operations and many others now may be improved by the installation of the stacker crane.

In general, the stacker crane is applicable wherever selective and accessible storage is necessary and for special purpose propositions. Wherever a large number of items must be stored or withdrawn from stock, the stacker crane will be considered. Incidentally, the capacity of the stacker crane may be increased to 6000 lb or more and still operate in less than six-



KEY SEAT and DOVETAIL CUTTERS by Reltool

Shank and
Arbor
Types

• Woodruff Key Seat Cutters by Reltool are furnished in both Shank and Arbor Types. Right Hand Cut, shank type, carried in stock; Left Hand Cut, special. Arbor Type Keyseat Cutters have staggered teeth, with side teeth relieved for narrow margin.

• Reltool Dovetail Cutters, Shank Type, are designed to take the place of arbor type and threaded hole angle cutters . . . for use in Reltool End Mill Holders.

The Reltool Line Includes: Arbors • Center Drills • Counterbores • Die Sinking Cutters • Dovetail Cutters • End Mills • Form Tools • Gear Cutters • Hollow Mills • Keller Cutters • Key Seat Cutters • Lathe Mandrels • Metal Slitting Saws • Milling Cutters — all types • Reamers • Spotfacers • Step Drills • Taps • Tool Bits • Specials. Write for Catalog 50.

Reltool CORPORATION
RELIABLE METAL CUTTING TOOLS

4540 W. BURNHAM ST. • MILWAUKEE 46, WIS.



UNIVERSAL

DRILL BUSHINGS

Universal Drill Bushings with superhoned bores have been the first choice of industry since the founder of Universal Engineering Co. originated standard drill bushings nearly 30 years ago. Available in standard and special sizes to speed and simplify your jig drilling at greatly reduced tool breakage costs. Complete stock of standard bushings available for immediate shipment. Write today for complete information.

UNIVERSAL ENGINEERING CO.
FRANKENMUTH 10, MICHIGAN

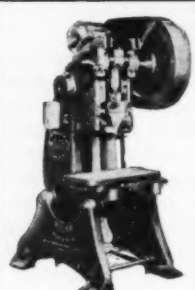
foot-wide aisles.

The du Pont Company has found that this new facility meets many of its needs, and has resulted in substantial savings in materials handling and storage space. With the American Monorail Company now licensed to build them, they are available to all industries.

In conclusion, the stacker crane does not replace a fork truck storage operation where material can be stowed away in large solid blocks with minimum aisle access. However, should conditions change to require immediate access to any stack, consideration of a stacker crane is recommended on the basis of greater and more economic space utilization.

This material is from a paper delivered before the third biennial Materials Handling Conference sponsored by Westinghouse Electric Corporation, Buffalo.

The End



**DEEP THROAT
 LARGE
 BOLSTER
 AREA**

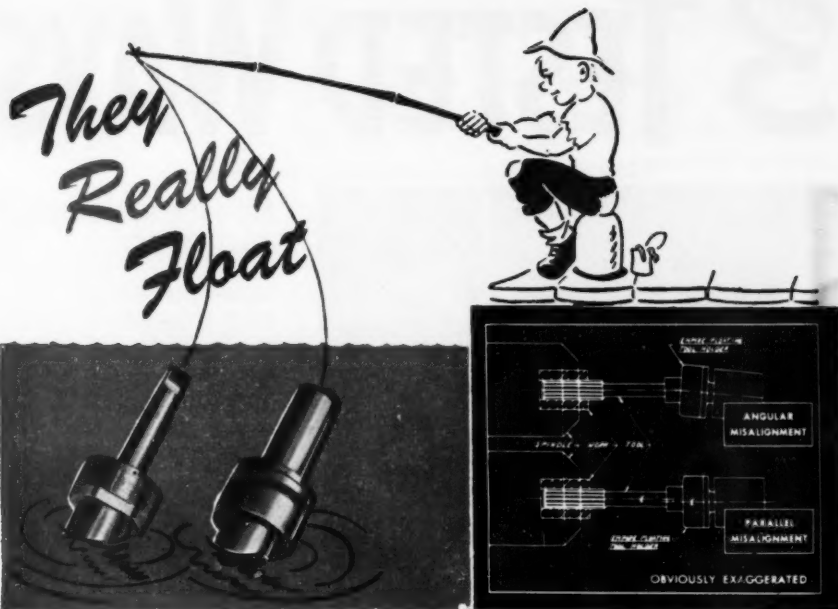
**An Ideal Press
 for
 Trying Out Dies**

The Walsh No. 38X Deep Throat 38 Ton Inclinable Power Press.

Other Walsh Presses Available from 6 to 65 tons.

Write Dept. "A" for Catalogs
 Fully Describing All Presses.

SCHULTZ & ANDERSON CO.
 111 EDISON PLACE
 NEWARK 5, N. J.



**EMPIRE FLOATING
REAMER HOLDERS
and
EMPIRE FLOATING
TAP HOLDERS**

And we do mean float!
These floating reamer and tap holders compensate for both out-of-parallel and angular misalignment and permit tap or reamer to float freely—in and out—and will not freeze under tension caused by drag.

By referring to the drawing you will note that the sleeve and shank float independently of each other—achieving a free and easy movement—a unique engineering design not found in any other floating tool.

With the Empire Floating Tool Holder you'll have no more bell mouths or over-sized holes. Holes can be reamed to close tolerances.

**Ask about the
Floating-Releasing
Tap Holder**

- that corrects for both parallel and angular misalignment
- that will not strip threads when tap is pulled out
- that permits adjustments of float to threading—right or left hand.

Send for folders giving full details

EMPIRE
8774 GRINNELL AVE. TOOL COMPANY DETROIT 13, MICHIGAN

3 TESTED WAYS

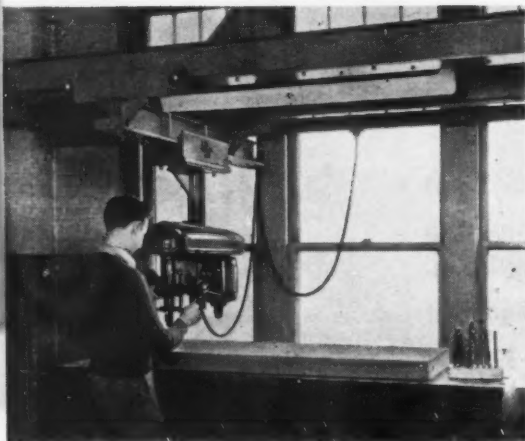


*Automotive moulding cut-off
speeded 1000%*

FOUR WHEEL DRIVE AUTO COMPANY

Clintonville, Wis.

All metal moulding used for truck cabs is cut on Delta abrasive wheel cut-off machine, with ten times faster production. Previous hand cutting methods entailed great operator fatigue and required a deburring operation. Delta cut-off machines are also available with saw blades for non-ferrous work.



*Overhead mounting for
Delta drill press reduces
handling of bulky panels*

KIRKHOF ELECTRIC CO.

Grand Rapids, Mich.

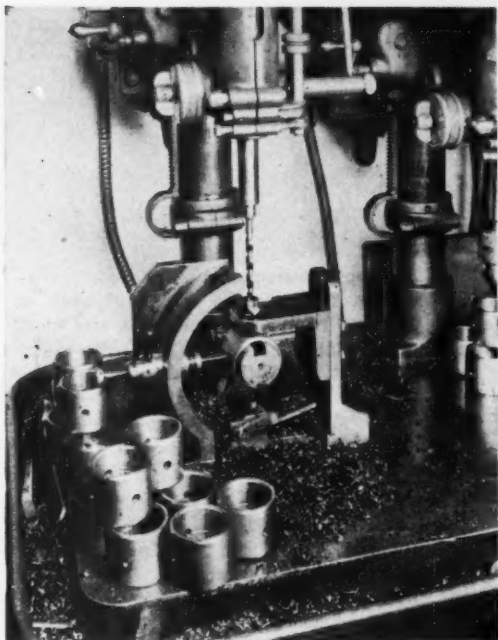
With an overhead crane mounting, a Delta 17-inch drill press will drill holes in any location on 36" x 96" switchboard panels without moving the panels. Both the drill head and bridge are suspended from ball bearings riding on flat cold rolled bars; and the whole framework is supported from the building structure for a clear field of operation. Panels are 1 1/4" ebony asbestos or 1/4" steel.

There's a Delta Power Tool for Your Job-

WOOD OR METAL WORKING

53 MACHINES — 246 MODELS — MORE THAN 1300 ACCESSORIES

to Save Time, Space or Handling with **DELTA TOOLS**



*With one fixture,
Delta drill press handles
57 different parts—*

REED-PRENTICE CORP.

Worcester, Mass.

A single ingenious jig, easily and quickly adjustable, is used to drill equally spaced holes in 57 different parts, with a big saving in tool storage space and manufacturing time. An arbor-holding bracket is adjustable horizontally and vertically, and an indexing pin in a double quadrant, inserted in the first hole drilled, locates the next hole accurately.

Delta users originate many unique and practical applications because Delta tools are so adaptable to so many jobs. Your Delta dealer will help you fit them to your own machining requirements. He's listed in the classified section of your phone book —under "Tools."



DELTA POWER TOOL DIVISION

Rockwell MANUFACTURING COMPANY

605 M E. VIENNA AVENUE • MILWAUKEE 1, WISCONSIN

How to improve plant layout and the use of equipment . . . part I

By Dr. Thomas G. Willson, Consulting Engineer

WHETHER we have prosperity or depression, industrial concerns need to be so organized that they are able to go through any lean periods without failure and through any periods of prosperity and expanded production without inconvenience. Efficient and economical operation depend to a large extent upon the layout of the plant, and the use of existing equipment coupled with the selection of such new equipment as will most economically increase production.

What is involved in plant layout? When we say, first, that plant layout includes the arrangement of buildings, departments, and equipment for production, we find that there are several things involved. There is the type of product, which may be of a continuous nature where the raw material goes in one end, passes through successive operations, and comes out complete at the other end; or it may be that the product is the assembly type, in which diverse and numerous parts are brought together in the form of a more or less complex finished product. Other factors include the amount of capital available, either to build buildings or to alter existing structures; the location of the plant itself with reference to sources

of supply, transportation and communication. There is the space available in existing buildings, which for the most part many of us simply have to make the best of without serious changes. There is the matter of manpower, both manpower requirements for production in the plant, and manpower available in the local community labor market.

Results

Results of poor plant layout

Many of us are familiar with the results of poor plant layout. The bottleneck is an old acquaintance of ours. Cross-handling and over-handling of material is familiar and wasteful. Unnecessary overtime, increased overhead, dissatisfied workers, all follow. Waste, scrap, rework increase; equipment is abused and overworked; quality drops; working conditions suffer and the optimum productive potential of the plant is never reached.

What can be done with proper plant layout?

What are some of the ideal conditions of production which may be attained through proper plant layout?

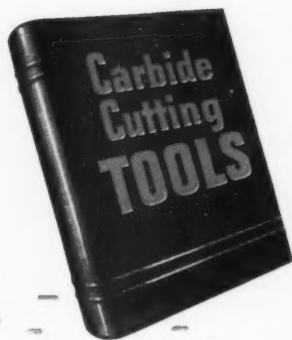
1. A straight line flow of work. The fact that a straight line is the shortest distance between two points may be

Who's Training *Your* New Employees . . .

Don't put your new employee
in this position . . . Help
him off to a good start with
the proper training aids . . .



Now available . . . **CARBIDE CUTTING TOOLS**, the first
authoritative text book on carbides, designed to inform
the student, the designer and the man at the machine.



"KNOW HOW"—the best productive use of man-power, machines and materials is essential in our present emergency. It is with this in mind that V-R is making this book available

CONTENTS: Machine Tools and the Carbides. Converting to Carbides. Tool Angles, Machinability. Tipping a Carbide Tool. Grinding Single-Point Tools. Cutting Power, Speeds, Feeds. Carbide Tool Design. Coolants and Carbide Tools. Carbide Forming Tools. Carbide Milling Cutters. Sharpening Milling Cutters. Multiple-Edge Carbide Tools. Cutting Speeds, Feeds, Forces. Multiple-Edge Tool Design. Selection of a Carbide. Tool Materials, Assembly. Grinding and Use of Tools. Index.

416 Pages. 283 Illus. Washable Cloth Binding.
Price \$5.50

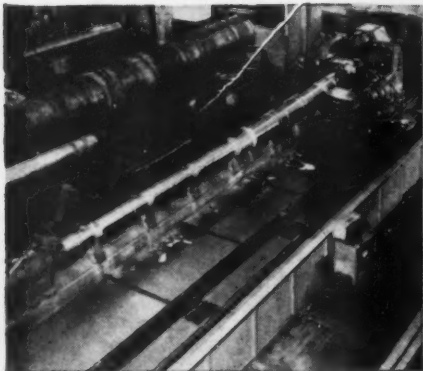
Companies' purchase orders will be subject to our regular terms. Book orders from individuals should be accompanied by check or money order. Please do not send cash because we will not be responsible. All books shipped prepaid. Offer limited to U. S. and Canada. United States funds only.

FREE . . . With each book purchased for your training program, a complete study guide specially prepared for V-R by the American Technical Society will be furnished without charge—compliments of Vascoloy-Ramet Corporation.

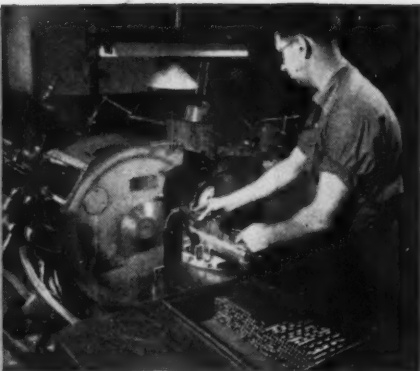
Send all Book Orders to: EDUCATIONAL TRAINING DEPARTMENT

VASCOLOY-RAMET
CORPORATION
WAUKEGAN, ILLINOIS



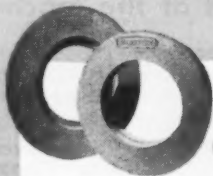


Grinding an ordnance part on the world's longest cylindrical grinder. On big jobs like this, where spoilage is so costly, the correct Norton wheels assure you the most consistently accurate results.



A plunge-cut grinding job on a centerless grinder, showing use of a hand-operated sliding work rest. Units being ground are high speed steel drills, for which wheels of Norton ALUNDUM® (fused alumina), is the correct grain size and grade, give best results.

In Your *Cylindrical* or



It's easier to
GET MORE UNITS { per dressing
per hour
per wheel

WITH NORTON O. D. GRINDING WHEELS

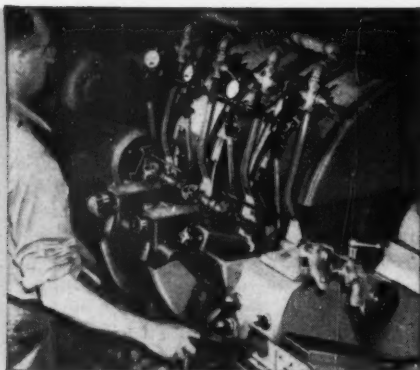
You want your cylindrical or centerless grinding wheels to produce exactly the required tolerances and finish . . . in piece after piece . . . hour after hour . . . with a minimum of dressing or replacement.

With Norton wheels it's *easier* to get these results. Here are the reasons:

1. Norton Range of Specifications Covers All Your O. D. Jobs. Whatever your material or job specifications — in the *complete* line of Norton wheels for O.D. grinding you're sure to find the *one* wheel with the *right* combination of abrasive grain type and bond for top cutting performance and extra long wheel life — and Norton uniformity assures this top performance in *every* wheel.

2. Norton Application Aid Covers Your Grinding Problems. In practically every case your Norton Distributor can quickly tell you which types of wheels you need. Backing him is the Norton Abrasive Engineer in your area. And behind both is the Norton technical staff, representing the resources and know-how of the world's largest manufacturer of abrasives.

3. Norton Stocks Cover Your Delivery Requirements. Your Norton Distributor keeps ample stocks of popular O.D. wheel types and sizes. Larger stocks are maintained in Norton warehouses in key cities throughout the country, and you can always count on prompt shipments from Norton Company's complete stocks in Worcester.

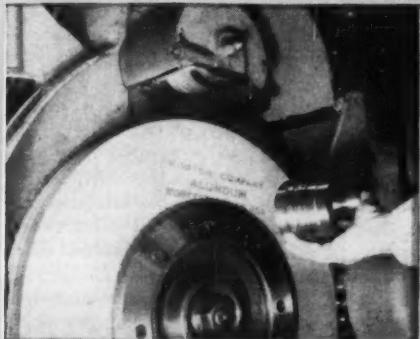


Cylindrical grinding of four diameters at once. Here, close uniformity of wheels is vital — another good reason for choosing Norton grinding wheels with their proved ability to grind multiple diameters to exactly uniform size with a minimum of dressing.

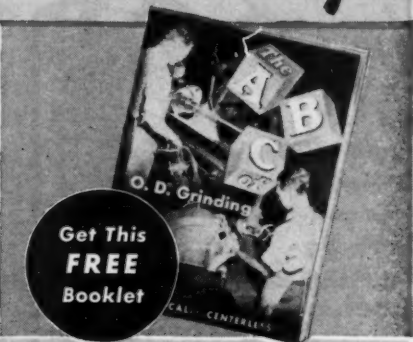


Through-feed grinding of hollow tubing in a centerless machine. Norton wheels are your best bets for peak production and quality in Q.D. grinding — on every type of material, from softest aluminum to hardest steel.

Centerless Grinding...



Shaping a wheel by crush truing, with hardened steel crusher roll shown in raised position. Both Norton ALUNDUM® and CRYSTOLON® wheels can be crush trued, to give excellent results in this rapidly growing method of grinding intricate O.D. contours.



This handy, illustrated booklet gives you the essential facts of cylindrical and centerless grinding, answering many questions and providing convenient selection charts. Ask your Norton Distributor for The A.B.C. of O.D. Grinding, or write direct for Form 2006. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities.

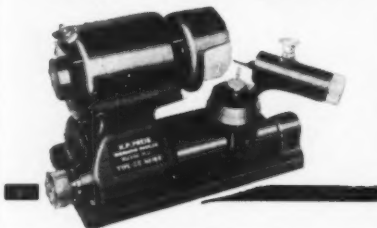
NORTON
ABRASIVES

Making better products to make other products better

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries



PRECISION CUTTER GRINDERS



This is the Famous PREIS-PANTO Model CG Single-Lip Engraving and Routing Cutter Grinder. Surprisingly low in price because of the high-production basis of manufacture.



Easy to use because of simplicity of design and SURE to give true centers on your cutters.

H. P. Preis Engraving Machine Co.
647 State H'way 29 Hillsdale, N. J.

Announcing COLONIAL #3

**A More
Wear-Resistant
Drill-Jig-
Bushing
Steel**

Fully
Field-Tested

To reduce your
bushing costs, specify
bushings made from
"Colonial #3"

All standard COLONIAL drill jig bushings are now made from Colonial #3—a new oil-hardening steel having many times the wear-resistance of former bushing steels. Also gives greater uniformity.

COLONIAL

BUSHINGS INC.
P.O. BOX 37, HARPER STATION
DETROIT 13, MICHIGAN

admitted, but it is often overlooked in planning the layout of a plant. Case I, described below, is a good illustration of the difference made by approaching a straight line as nearly as possible.

2. The most effective use of equipment. Where there is poor layout, there are often bottlenecks. Parts fail to arrive at the point of use in proper correlation. Overtime work is required. Machines become overworked. Many times there is an excess of short runs on machines to produce two or three dozen of a given part needed to get out completed units on schedule. This means frequent breakdown and re-setting of machinery, resulting in additional wear and tear.

3. Adequate storage space, suitably located. Storage space has been one of the greatest headaches, especially among the smaller firms where rapid expansion of production has taken place. Not only has increased production demanded greater stocks of raw materials, but also the apparent shortages of various materials has resulted in a variety of hoarding practices which still further increase individual stock piles and further aggravate the storage problem. Storage of materials, to be effective, must be planned not as just any vacant space in which to put materials for a time, but as an integrated part of the production process, so that sufficient space is available for the materials, and so that the materials are at all times readily available when required in production.

4. Use of labor saving equipment, such as power-driven trucks, cranes, hoists, conveyors, chutes, etc., is an ideal for many situations, and should be considered carefully even in smaller plants. While in normal times the economy of using such devices may be considered in terms of the amount of production, labor costs, overhead, available capital, etc., labor saving equipment for material handling almost always will make an important contribu-

WESSON

**28 YEARS OF EXPERIENCE
IN ENGINEERING AND
DESIGNING SPECIAL
CARBIDE TOOLS**

**DO THE JOB BETTER . . . FASTER . . .
AT LESS COST . . . USING**

WESSON

*Special
Carbide
Tools*



★ ELIMINATE TOOL
CHANGES

★ COMBINE OPERATIONS

★ INCREASE SPEED AND FEEDS

**SEND US YOUR
BLUEPRINTS**



**SPECIAL REAMERS
SPECIAL COUNTERBORES
SPECIAL MULTI-DIAM. TOOLS
SPECIAL END MILLS
SPECIAL FACE MILLS
SPECIAL CORE DRILLS
SPECIAL MILLING CUTTERS
SPECIAL TOOL HOLDERS
SPECIAL CARBIDE TIPS
SPECIAL CARBIDE BLADES
SPECIAL CARBIDE SHAPES
SPECIAL FLAT TOOLS**

Wesson's experience in carbide began over 28 years ago when Wesson first applied "Widia Metal" the original Krupp Carbide to metal working tools in 1923.

Wesson's experience and production facilities give you a combination of manufacturing skill and engineering "know-how" that cannot be matched.

"Wessonmetal" the carbide produced exclusively in Wesson Metal's own plant—and Wesson Tools have established records in America's leading industries for outstanding production.

WESSON COMPANY *Affiliated with*
WESSON METAL CORPORATION

1220 Woodward Heights Blvd., Ferndale (Detroit 20), Mich.

PIONEERS
IN THE ART OF
DESIGNING
AND
PRODUCING
CARBIDE TOOLS

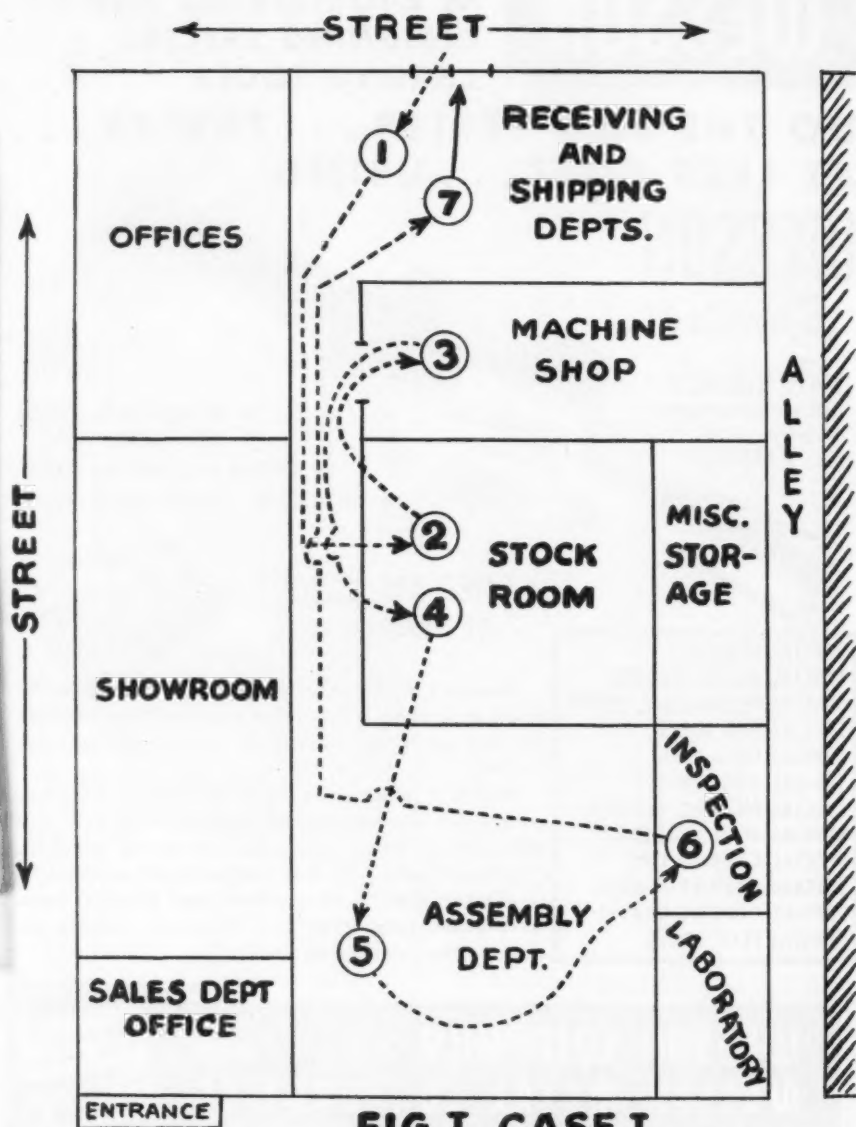


FIG. I CASE I

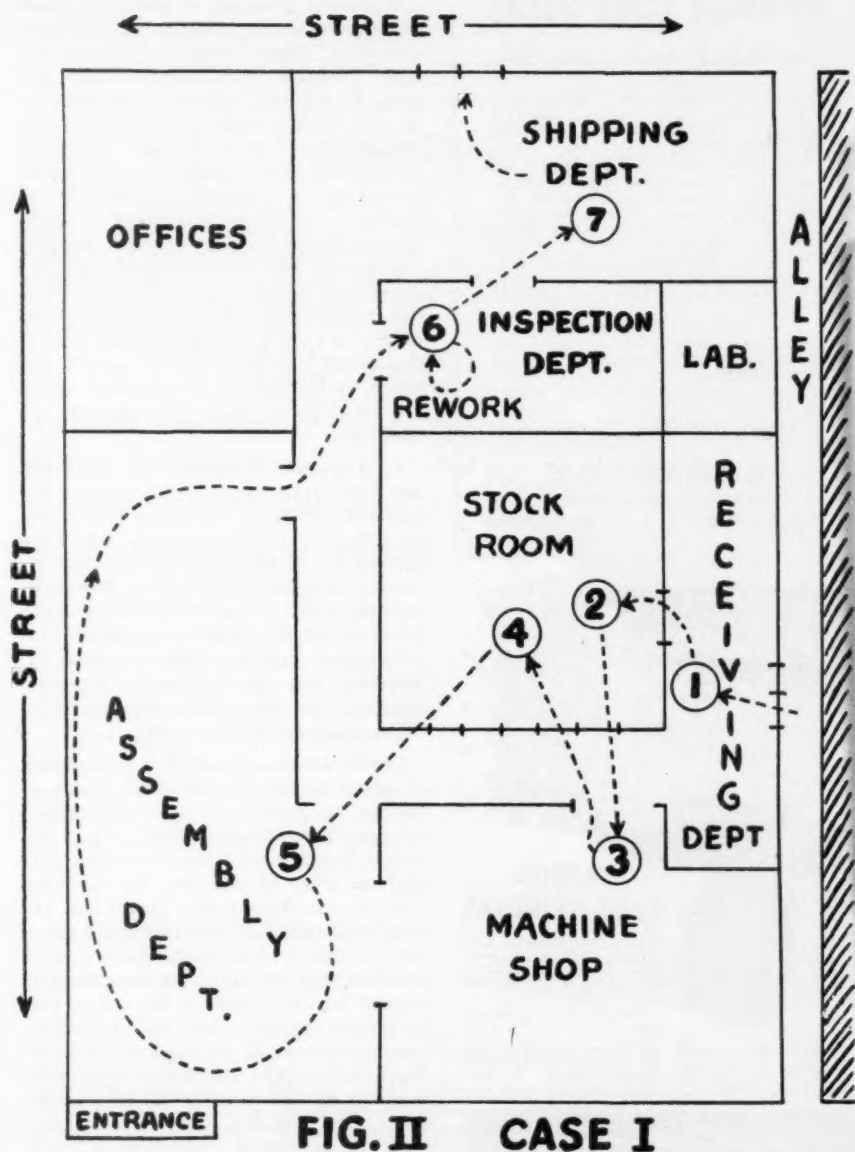


FIG. II CASE I

CARBIDE TOOL USERS

Get these 6 training slide films

Improve worker skill, train new men faster. Cut waste, increase productivity, conserve cemented carbides, too.

Six clear, easy to understand 35-mm silent slide film strips featuring: 1—What is Cemented Carbide? 2—Designing Single Point Cemented Carbide Tools. 3—Brazing Cemented Carbide Tools. 4—Designing and Grinding Chip Breakers. 5—Grinding Single Point Cemented Carbide Tools. 6—Applications and Trouble Shooting.

They are training films (not advertising). Available at approximate print cost. Complete set \$15 (f.o.b. Detroit). Singly, \$2.50; specify title. Included with each order: Instructor's Manual plus booklets of films. Send today for your films or free descriptive folder, GT-223.

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

11129 E. 8 Mile Road

Detroit 32, Michigan



Model WD-10 Wet or Dry 10" Carbide Tool Grinder.

6", 7", 10", 14" Wet or Dry—also Chip Breaker and Diamond Finishing Grinders.

WRITE FOR CATALOG 225

Hammond Machinery Builders

1614 DOUGLAS AVENUE KALAMAZOO 54, MICH.

tion to the over-all profit picture.

5. Proper grouping of machinery and equipment within a department. "Type grouping," where machines of one type and function and similar size are grouped together, gives an opportunity for specialized supervision and a close refinement of measurement of finish, consistent high production to close tolerances, and similar advantages of quality. "Process grouping," where various types of machines are grouped together in the order of operations required, permits the material to go from one machine to the next in fast time, which is an advantage when many thousands of small parts are being made, and a fraction of a second saved on each piece runs into savings of thousands of dollars.

6. Adequate facilities for receiving raw materials and for shipping the finished product. In many concerns, receiving and shipping are functions carried on in the same room, often in each other's way, and exist in that state only as a carry over from earlier days when production was more leisurely or in smaller quantity. Case I below illustrates the advantages of separate shipping and receiving departments in different parts of the plant.

Let us examine Case I as a problem in plant layout. In the first drawing, we see the plant as it appeared before changes to improve layout were effected. Located on a street intersection, with an alley on one side, all business and manufacturing was performed on one floor. Offices, showrooms and sales offices took up the front of the building. Shipping and receiving departments opened into the street at the end of the building, machine shop and assembly departments were at opposite ends of the building, and the stock room was roughly in the middle of the whole thing. The firm was engaged in manufacturing electrical appliances for the automotive industry, which meant small



*Say...
I'm Really Proud of
that Production Record*

**Versatile Kempsmith
Milling Machine Proves
Ideal for Long Production Runs**

You'll find the new Kempsmith LH Miller gives you a rugged, lightweight machine that combines simple, rigid construction with maximum flexibility. It enables you to attain your production goals on such jobs as small end milling, high speed jig boring, keywaying, oil grooving, light straddle milling, etc. Designed by experienced Kempsmith Engineers . . . men who have met the milling machine requirements of industry for more than 60 years. Write for your copy of Bulletin No. 127 describing this versatile machine.



KEMPSMITH MACHINE CO.
1827 SOUTH 71ST STREET
MILWAUKEE 14, WISCONSIN, U.S.A.

**KEMPSMITH
LH MILLER**

KEMPSMITH

Precision Built Milling Machines Since 1888

NIAGARA

ANNOUNCES A NEW Model 8-8 Hi-Production CIRCLE SHEAR AND FLANGER

- Cuts clean, accurate discs up to 75" dia. in a matter of seconds.
- Turns smooth, high flanges on heads up to 73" dia. in a matter of seconds.
- Capacity up to 8 ga. mild steel, 12 ga. stainless steel.
- Minimum investment in machine and tools for hi-production of a vast size range of discs and heads.
- Fast set up for either circle shearing or flanging operation.
- Ideally adapted for either high or low and even single quantity production.
- Effortless push button control with new automatic feeding cycle.
- Variable Speed Power Flanging Feed lowers and raises upper flanging roll at optimum speed for ideal flanging. Operator can dial to proper feed rate to suit thickness of material.
- Unbreakable steel construction throughout.

Write for Bulletin 86

For Your Defense Production



NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, NEW YORK

*Manufacturers of America's Most Complete Line of Presses, Shears, Machine and Tools
for Plate and Sheet Metal Work*

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK



Enlarged cross section
of the teeth of
a typical Nicholson file.

The right teeth make a big difference

Proper design, even height, uniform sharpness and correct hardening of teeth are tremendously important in lengthening the life and increasing the efficiency of a file. They take on added significance as defense preparedness calls for production speed-ups, steel conservations and maximum tool wear.

Nicholson manufacture has always given uppermost thought to

these vital factors relating to the myriads of tiny "business ends" of one of industry's most indispensable hand tools.

Thus, it can be said that Nicholson and Black Diamond files "speak through their teeth." And what they say is, "*Twelve perfect files in every dozen—made from top-quality file steel and 87 years' experience.*" Sold through industrial distributors.

HOW TO SELECT, USE AND CARE FOR The right file for the job is interestingly described in words and pictures in Nicholson's famous book, "**FILE PHILOSOPHY.**" FREE. How many copies do you need? Write to—



NICHOLSON FILE CO., 14 Acorn St., Providence 1, R.I.
(In Canada, Port Hope, Ont.)



NICHOLSON

A FILE FOR EVERY PURPOSE

parts assembly of a large electrical apparatus, combined with sufficient machine shop operations to finish castings, fabricate copper sheet metal parts, shape various block and housing parts, etc. Most of the parts were bought ready made from other manufacturers. The plant employed slightly more than 100 persons, exclusive of office and sales personnel. There was one central factor around which the plant operated: the stock room, handling the countless small parts. And through some accident of design in the building, the stock-room was solidly built into the foundations of the building in such a way that whatever changes might be made in

the layout of the plant, the stock room could only be exactly where it was and exactly the same size as it was . . . without such excessive expense in building reconstruction as to make the change uneconomical.

The business began to grow. Personnel increased to around 250, with three shifts in operation. The capacity of the machine shop had to be increased about a third in terms of space and equipment, and four times in terms of production to service three shifts. The assembly department required more than twice the space, and had with three shifts nearly eight times as many workers as before.

DON'T GET HUNG UP ON THIS WIRE ROPE QUIZ

by Professor Herman Reichardt, Consulting Engineer

Count ten for each one answered correctly. 70-100 is excellent; 50-60 is good; 20-40 . . . well, one can't know everything; below 20 . . . here's a piece of rope.

1. Crane rope has **6** or **10** strands of 37 wires around a hemp center. _____
2. Extra flexible hoisting rope has **6 strands of 30 wires** or **8 strands of 19 wires** around a hemp center? _____
3. Guy strand wire is galvanized **7** or **9** wire strand? _____
4. Increasing the diameter of the pulley equal to **two** or **three** circumferences of the rope doubles the life of the rope? _____
5. Cast or plow steel indicates **crucible** or **open hearth** steel? _____
6. A wire center rope is **5, 7** or **10** percent stronger than a hemp center rope? _____
7. Working stress should not be greater than **one third** or **one fifth** of the bursting strength? _____
8. Lays rope has wires and strands in **opposite** or **same** direction? _____
9. Transmission rope has **6** or **8** strands of 24 wires each? _____
10. Right lay rope has **strands twisted to the left** and **rope to the right** or **strands twisted to right** and **rope to left**? _____

Answers to quiz on page 241



THE CRALEY OFFSET BORING HEADS

- Note depth of bearing.
- Tool carrying block most accurately fitted of any boring head made.
- Large graduated dial screw—easily read callibrations.
- Note minimized overhang.

- Tension screws on opposite sides and ends of block—all cutting strain thrown against solid metal.
- Nine sizes.
- 20 years of Craley experience specializing in boring heads.



C. C. CRALEY MFG. CO.

SHILLINGTON

PENNSYLVANIA

SHUR-LOCK MORSE TAPER ADAPTERS



- Reduce set-up time
- No set-screw slots
- Micro-Nut locks any place on Adapter
- Spanner wrench holes standard, slots optional
- Acme threads insure accurate fit in Spindle
- All sizes 1/2" to 1 1/4"



Seibert & Sons, Inc.
E. Peoria 8, Ill.



STANDARD D-4 Abrasive Band Grinder

Famous
for
Stamina

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood 4x36 1/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.

333 Nassau Avenue, Brooklyn 22, N. Y.

Not only was there no place to put all these people, but as can be seen in figure 1, materials were running around the plant in diverse directions, retracing and cross-handling in such a way that much time and effort was lost. The overall handling of materials through the plant was analyzed and charted as shown, revealing seven main steps:

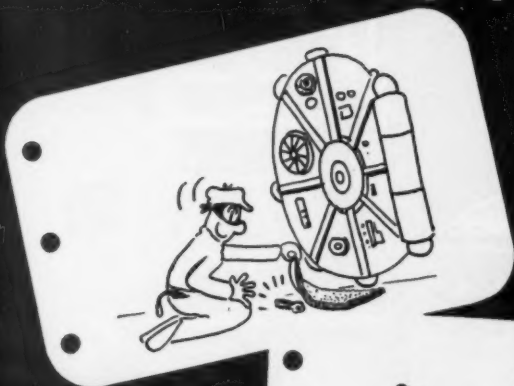
1. Materials received in receiving department.
2. Materials delivered into stock room, sorted, put on shelves and in bins.
3. Materials delivered to machine shop for finishing and fabrication.
4. Material delivered back to stock room and put away again.
5. Materials delivered to assembly department as needed.
6. Completed unit delivered to inspection department.
7. Satisfactory unit delivered from inspection department to shipping department.

The manufacturing process was checked and rechecked, and it developed that whatever the arrangement of the plant, there would still be the same seven steps. The problem of extra space was partially solved by eliminating the showroom entirely, and consolidating the sales offices with the other offices. The machine shop was kept in production where it was for the time being, and the assembly department was expanded and moved over as shown in Figure 2. When the assembly department had gotten settled a bit, the machine shop was gradually moved, so as to take only one machine out of production at a time. The laboratory and receiving departments were shifted as shown, and a small amount of additional storage space was rented in a building across the alley (not shown in diagram).

The changes made in layout made the required expansion of over one-third in the machine shop and more than 100% in the assembly department

INGENUITY

can solve any problem



if
YOUR
PROBLEM

higher production of

HY-PRO

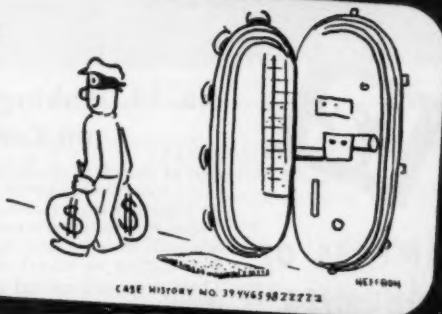


TOOL CO.

NEW BEDFORD, MASS., U.S.A.

Subsidiary of

Continental Screw Co.



CASE HISTORY NO. 39465982272

NET1004

involves the
threaded parts

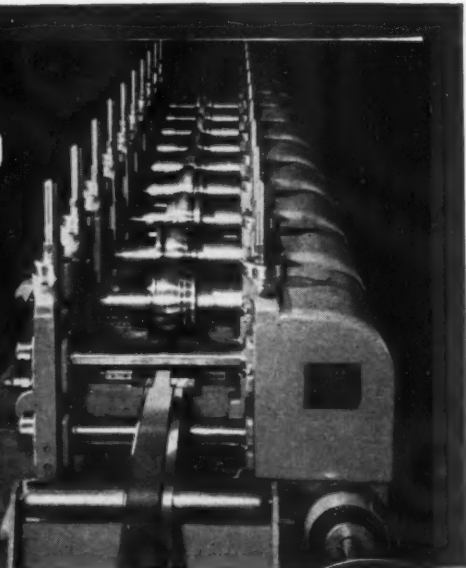
TAPS

can help you
to a solution

Order from your distributor
or call the HY-PRO SALES ENGINEER



Roll forming machine can form dual wall molding 1 and 2 shown. Seaming and welding may be followed by forming the stainless face and to protect edges of channel, brackets, etc.



12

EXAMPLES OF ECONOMIES

effected by combining
different operations
in a YODER Roll
Forming Production
Line

No. 11. Making Stainless-faced shapes on Carbon Steel Base

One of the ads in this series showed how a new type of telephone cable was covered by aluminum and paper, and the seam sealed by injection of a viscous cement—all in one passage through a Yoder roll forming machine. Another ad showed how welding rod was made by cold forming a tube, filling it with powdered flux, cutting to length and sealing the ends in a Yoder line.

These are quite special examples, but indicative of broad possibilities. An example of more general application is the making of duplex moldings, combining a carbon steel strip (for strength) with a thin covering of stainless or non-ferrous metal, to present a beautiful, rust-resisting wearing surface.

Millions of feet of such moldings are being used annually by manufacturers of metal furniture, electric and other household appliances, food service and automotive equipment. New applications are constantly being found.

Equipment needed consists merely of two coil boxes, a Cold Roll Forming machine and an Automatic Cut-off, all standard Yoder units. As such a line will produce upwards of 30,000 feet per day, with only one operator, the conversion cost per foot is insignificant.

THE YODER COMPANY • 5509 Walworth Ave., Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS—cold forming and welding

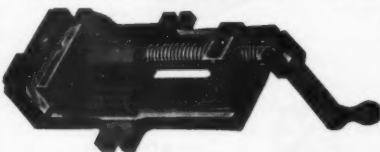


possible, and at the same time reduced by 35% the distance traveled by all materials used in manufacturing the goods. Bottlenecks traceable to causes within the plant were for the most part eliminated, and the best possible use of existing space permitted optimum production. Even more important, however, a fundamental layout with regard to materials handling was established which would render all operations more efficient regardless of future increases in production or cut-backs due to changes in the general economic situation.

End of Part 1

Ernest R. Jacobsen has been named vice president in charge of sales for Paul and Beekman, Inc., Philadelphia, manufacturers of metal stampings and assemblies. James A. Fritts has been appointed company vice president and works manager.

YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, inches	Open inches	Weight Pounds
1D	3 1/2	3 1/2	12 1/2
2D	5	5 1/2	23

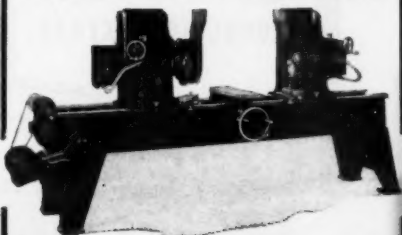
Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

YOST MFG. COMPANY

1335 SO. MAIN STREET
MEADVILLE, PENNSYLVANIA

"OLIVER" SEMI-AUTOMATIC Double End Miter Saw



Trims both ends of soft or thin metals smoothly, accurately, in half the time!

Cuts both ends square or at any angle up to 45°. Automatic feed—4 to 12 strokes a minute. Capacity: thin metal up to 2" high, 4" wide; 7" to 72" long. Motor units have V-belt drive—1600 r.p.m.

Write for Bulletin No. 195-V

OLIVER MACHINERY COMPANY
GRAND RAPIDS 2, MICHIGAN

PERFORMANCE PROVED THRIFTMASTER Gear Driven Eccentric Type

Adjustable DRILLHEADS

- Rugged FULL BALL BEARING Construction—hardened parts used throughout.
 - 31 STANDARD MODELS—to fit a wide variety of specifications.
 - DRILLING CAPACITIES—from No. 60 to 1 1/2" in Steel—rated to drill disintegration.
 - FULLY ADJUSTABLE—from 1" min. to 14.2" max. 2 to 4 spindles.
 - For Drilling, Reaming, Tapping and other machining operations.
 - Prompt Delivery on Standard Heads.
- Full Line of Standard Universal Adjustable and Special Fixed Center Drillheads . . . Automatic Reverse Tap or Drill Units. Write for the Thriftmaster Catalog.



Subsidiary of Thomson Industries, Inc.

Also makers of
DORMAN AUTOMATIC REVERSE TAPPERS
4 Sizes • Friction & Positive Drive Capacity
No. 2-56 to 2" in Steel.

THRIFTMASTER PRODUCTS CORPORATION

Division of Thomson Industries, Inc.

1030 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

Check

**THESE
PRODUCTION EXTRAS:**

- ✓ ALL-GEARED HEAD
- ✓ QUAD-V-BELT MOTOR DRIVE
- ✓ SEPARATE LEAD SCREW, FEED SHAFT
- ✓ SPEED FOR CARBIDE MACHINING



**Buy THE MOST LATHE
FOR MORE WORK**

● These are but a few of the production extras offered on Rockford Economy Lathes — and in a price class usually found only for smaller, lighter tools.

Rockford Lathes have ample reserve to take care of a wide range of straight-production, tool room or maintenance work. Features include 5 H.P. motor, 1-9/16" spindle hole, and quick change gear box providing carriage feeds from .004" to .060" and full range of threads from 4 to 56.

Twelve spindle speeds are easily and quickly selected through convenient shift levers. The spindle and all head shafts run in precision Timken bearings. These features assure capacity for close work, fast set-up, savings in non-productive time, and easier work for the operator.

When you're buying lathes, look for the *most* lathe, to give you *more* work. A Rockford representative can give you this complete story, price and all. Why not call him today and be set for those lathe jobs.

Ask for a copy of our Bulletin 900D.

**MEDIUM SIZED
ECONOMY PRICED**

ROCKFORD ECONOMY LATHES—16" and 18"

ROCKFORD MACHINE TOOL CO. • ROCKFORD, ILLINOIS

Compression-formed seamless tubing can cut machining costs



By L. A. Karg

Tube Reducing Corp.

Wallington, N. J.

COMPRESSION formed tubing provides excellent opportunities for cutting machining costs. In this sense it could be thought of as a new material which is available with closer tolerances, is finer grained, has uniform microstructure and has a depth of decarburization so shallow as to be negligible. These characteristics permit machining the tubing at higher cutting speeds and feeds with consequent machining cost reductions that can be as high as 50 per cent. In some cases tolerances are so close as to eliminate machining.

To appreciate how such results are possible it is helpful to note the differences between cold-drawing and process of compression sizing, called the Rockrite process, developed by Tube Reducing Corp. Cold-drawing consists essentially of drawing the tube through a die and over a mandrel in order to reduce the size of the starting tube and to make it more accurate in the O.D., I.D., and wall thickness. Cold-drawing also improves the surface finishes and may harden the metal ad-

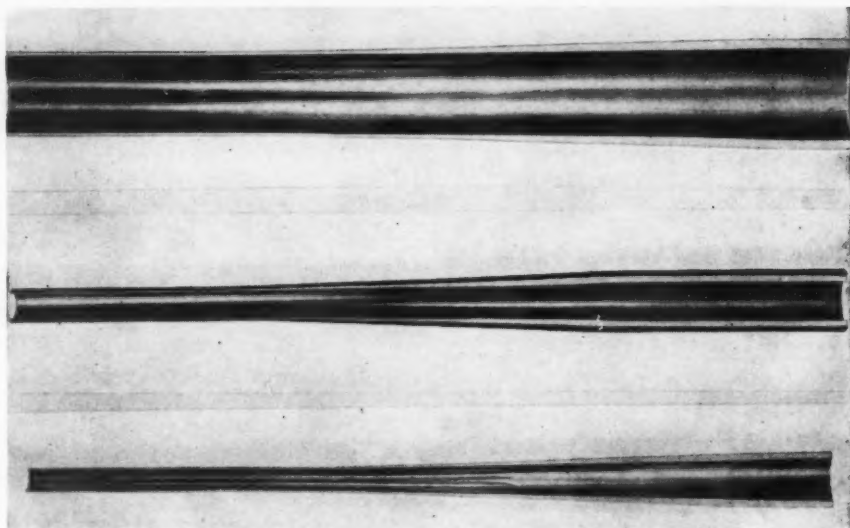
jacent to the inner and outer surfaces through cold-working.

The Rockrite process

The Rockrite process works the metal in the tube under compression and causes it to flow both longitudinally and circumferentially. Surface finish is improved without affecting surface hardness, decarburization is decreased; machining allowance is .018". Tubing is made in sizes from $\frac{3}{8}$ " up to 6" diameter. Where accurate, small tubes are required, say 1/16" diameter, the process is used to bring the size under 1" diameter and thus correct ovality and varying wall thickness prior to final drawing stage.

The new process employs semi-circular, grooved dies which rock back and forth over the tube. This compresses the metal of the tube against a mandrel which controls the inside diameter.

The grooves of the dies are tapered, one end being slightly larger than the



Tapered tubes formed by the Rockrite compression-formed tubing process.

outside diameter of the tube to be sized. As the dies roll over the tube, the gradually diminishing cross-section of the grooves results in a compression of the tube walls against a correspondingly tapered mandrel. Thus, the outside diameter, the inside diameter and the wall thickness are reduced and its length is increased.

Suitable mechanisms feed the tube longitudinally through the reducing machine and give the tube a part turn on its axis so as to distribute the work over the entire circumference of the tube. These feeds are intermittent, being timed to operate after the dies have completed their forward stroke.

The intermittent rotation or increment feed of the tube, with each work cycle of the dies, is important, as it has a marked and unique effect upon the accuracy of the finished tube. It results in what might be called circumferential step reduction, since successive

areas around the circumference of the tube are worked, one after the other.

The step-by-step work around the tube wall tends to eliminate any variations in wall thickness, ovality of bore or eccentricity of hold that may be present in the original tube. Thus, metal tends to flow from a thick section to an adjacent thinner section.

Metal is worked by compression

Another most significant feature of the process lies in the fact that the metal in the tube is worked by compression instead of under tension. For this reason the amount of work done in a single pass is limited only by the strength of the machine and the wear resistance of the dies. Relatively enormous reductions in size are not only possible, but practicable. Thus, it is feasible to select for reduction a tube of large size and bring it to small diameter, with enough work done on it to secure the desired dimensional toler-

Specify EX-CELL-O Precision Spindles GRINDER MANUFACTURERS DO!

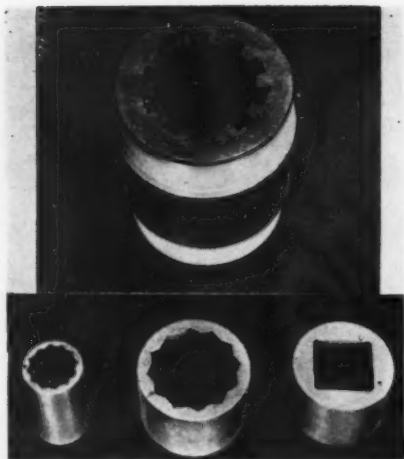
You can insure the accuracy of your grinding equipment as many grinder manufacturers do —by standardizing on Ex-Cell-O Precision Spindles. Prominent machine tool builders install Ex-Cell-O Spindles as original equipment on internal grinders, universal grinders, surface grinders, gear grinders, tool and cutter grinders and special-purpose grinders.

Select the grinding spindles you need from the big Ex-Cell-O Spindle Catalog. If you don't have a copy, write for one today on your company letterhead. There is no obligation, of course.



EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN



Four examples of special internal bores.

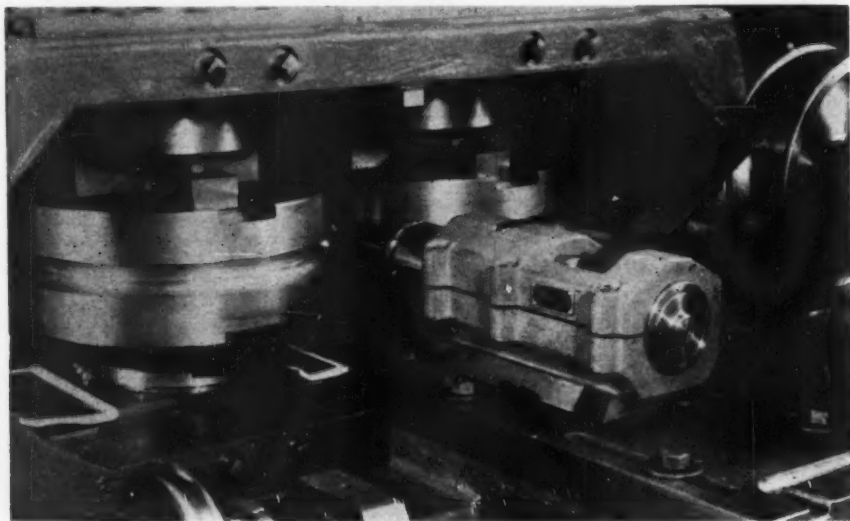
ances or finish, without the hitherto inescapable penalties of multiple draw-bench passes and intermediate heat-treatments between passes. Compres-

sion working also makes possible the sizing of tubes of many materials which cannot be drawn through a die.

The remarkably smooth surfaces of compression-formed tubing are the result of the manner in which the metal is worked. As the dies compress the metal against the mandrel they tend to iron out small irregularities of the outside and inside surfaces of the metal. The metal flows from high spots into indentations in the same manner as when it is forged or extruded. In addition, a certain amount of burnishing or planishing action takes place as the tube elongates under the pressure of the dies and creeps forward while in contact with the dies and mandrel.

All steels contain a certain amount of carbon which influences their mechanical properties and the effectiveness of heat-treatment. It is therefore necessary that the normal carbon content be held to close limits in a steel of a given type if the character of the

Special set-up for grinding the dies used in the Rockrite process . . . An internal grinding spindle is mounted on the cross-slide.



SANFORD

SURFACE GRINDER

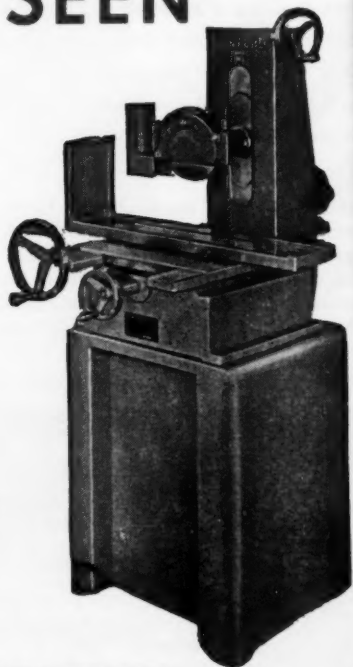
HAVE YOU SEEN

Model MG

**A GRINDER
LIKE THIS BEFORE**

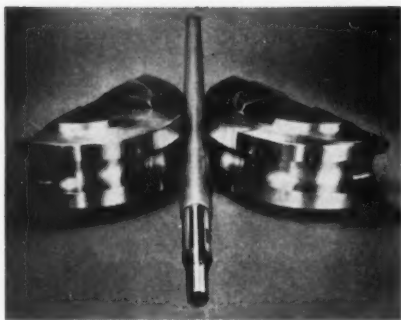
-- COMPARE --

Capacity: 8 $\frac{3}{4}$ " transverse, 13" longitudinal, 12" vertical under 7" dia. Wheel with Adapter. Meehanite Castings and the very sturdy construction (weight appr. 630 lbs.) assure long life, accuracy, vibrationless operation, form grinding by crush methods and finishes to microinches, dry or wet.



WRITE FOR COMPLETE DETAILS

SANFORD MANUFACTURING CORP.
1020-28 COMMERCIAL AVENUE
UNION, NEW JERSEY



Two dies and a mandrel . . . The grooved dies rock back and forth over the tube. This compresses the metal of the tube against a mandrel which controls the inside diameter.

steel is to be maintained. However, some manufacturing processes tend to remove carbon from the outer layers of the steel, usually by oxidation during heating. This layer may be thick or thin depending on several conditions.

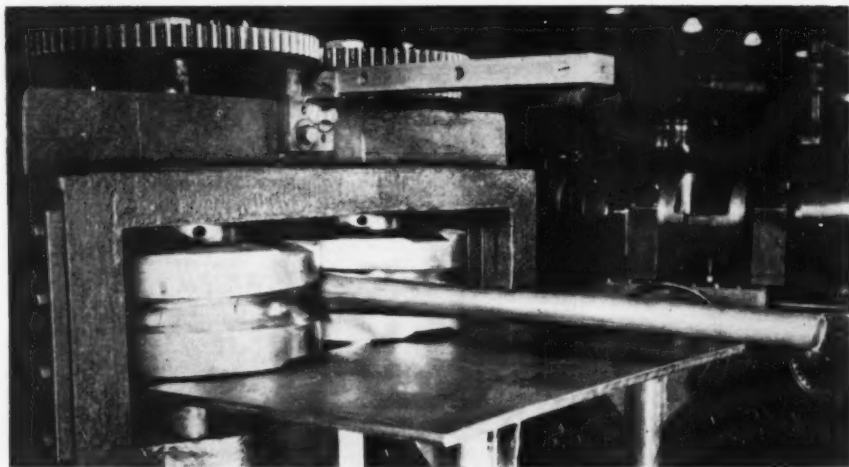
Decarburization

Decarburization is not necessarily objectionable. In boiler tubes it would not be noticed. In other classes of tubes it may be extremely detrimental. It might make the steel less machinable and thus slow down certain necessary finishing operations, and it may interfere seriously with heat-treating operations carried out for the purpose of hardening the surface metal as in the manufacture of ball-bearing races.

When decarburization is objectionable for any of these reasons, and when it cannot be avoided during the manufacture of a tube, it is eliminated by machining. Of course, the tubing must have sufficient stock in the wall to permit the removal of the decarburized layers. This may, and frequently does, necessitate the purchase of tubing having a substantially heavier wall than is wanted, the additional metal representing a double expense—in the first cost of the tubing and in the removal of the unwanted materials.

Tubing made by any process may

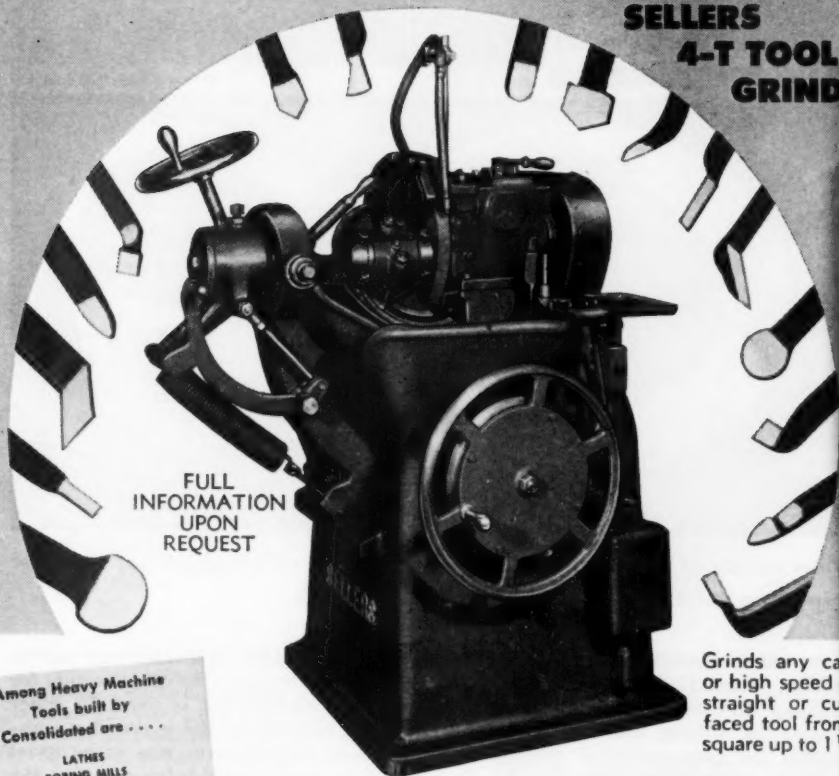
Lead tubing . . . is employed to check the sizes of dies before finish grinding the grooves.



BETTER TOOL GRINDING

MEANS LOWER PRODUCTION COSTS

**SELLERS
4-T TOOL
GRINDER**



FULL
INFORMATION
UPON
REQUEST

Grinds any carbide
or high speed steel,
straight or curved,
faced tool from $\frac{1}{4}$ "
square up to $1\frac{1}{2} \times 2$ "

Among Heavy Machine
Tools built by
Consolidated are . . .

LATHES
BORING MILLS
DRILL PRESSES
MILLING MACHINES
BORING MACHINES
COLD SAW MACHINES
BORING, DRILLING AND
MILLING MACHINES
DRILL AND TOOL
GRINDERS
PLANERS
SLOTTERS
RAILROAD SHOP TOOLS
AUTOMOTIVE TOOLS
AND OTHER
SPECIAL MACHINES

The grinding precision and uniformity of Sellers Tool Grinders are the result of the Sellers Line Contact Principle of grinding, accomplished by moving the work up and down in a straight line tangent to the periphery of the grinding wheel, in this way allowing the work to contact the wheel along a line only. Proper rake and clearance angles at the cutting edge are quickly and economically obtained. The operation is so simple that a tool-room attendant can easily maintain tools for the entire shop.

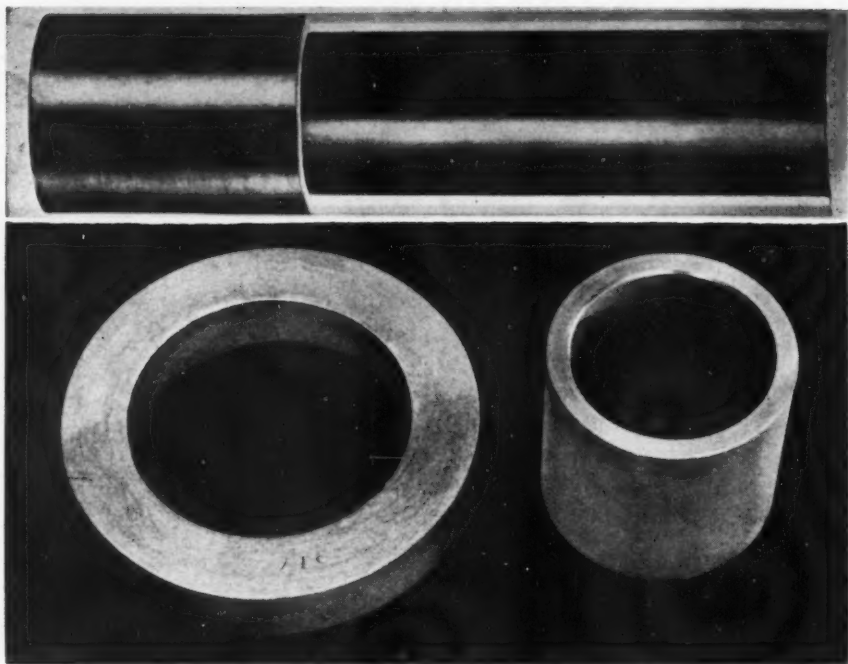
BUILDERS OF HEAVY DUTY MACHINE TOOLS SINCE 1840

BETTS • BETTS-BRIDGEFORD • COLBURN • HILLES & JONES • MODERN • NEWTON • SELLERS



**CONSOLIDATED
MACHINE TOOL CORPORATION**

ROCHESTER 10, NEW YORK



Three samples of Rockrite tubing . . . Upper one shows fine finish inside and out; lower ones show finished thin and thick wall tubes.

have either shallow or deep decarburization, depending in part upon the number and nature of heat-treatments given the tubing and the extent to which the cross-sectional area of the tubing is reduced after it is decarburized.

Any decarburized surface of a tube which is compression reduced is almost always thinned down to such a thin layer as to be negligible. The precise reduction in the depth of decarburization will depend upon the percentage reduction in cross sectional area of the metal in the tube. This reduction is normally the equivalent of that resulting from three to five cold-draw passes, which are sufficient for this purpose.

But this number of passes may not be necessary to secure the other results for which cold-drawing is used. In other words, customary and every-day compression reduction in size is as great as that used in cold-drawing for the purpose of reducing decarburization, and may even be greater. Furthermore, no intermediate heat treatments are necessary in this reduction of compression-formed tubing, so there is no liability of the tube being decarburized while undergoing treatment for decarburization.

Variables in the metal

There are many variables with which



Grinders you can't **OVERWORK**

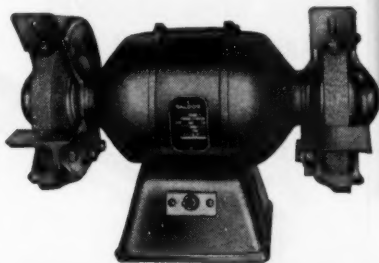


The $\frac{1}{2}$ hp motors that power these Baldor Grinders have no commutator, no centrifugal switch, no brushes—really trouble-free motors that will not burn out even when over-loaded repeatedly. Electronically balanced within 1/50 ounce of perfection, the armatures rotate at 3400 RPM without vibration—an engineering achievement that makes true precision work possible. Only first-grade wheels are used, and we re-check these at our plant for balance; Baldor Patented Balance Flanges are added when necessary. These grinders are built to do precision work and take plenty of punishment at the same time.

Phone your industrial distributor now or clip this ad to your letterhead and mail for grinder bulletins.

BALDOR ELECTRIC COMPANY
Motors-Grinders-Battery Chargers
4368 Duncan Ave. St. Louis 10, Mo.

ABOVE: Carbide Tool Grinder with reversible motor for sharpening both left and right hand tools.\$142.60



ABOVE: No. 8100 Grinder. 60 cycle, 1700 rpm motor. 8" x 1" first-grade wheels. (36 and 60 grit.) Heavy shaft, $\frac{3}{4}$ " arbor.\$88.00

the manufacturer is forced to contend:

1. The degree of anneal of the starting tubes—some may be fully annealed, other only partially so.

2. The grain structure of the starting tubes. It is, of course, possible to give the starting tubes a spheroidizing anneal, but this is a long and costly annealing cycle except for the high carbon steels such as SAE 52100.

3. The segregation of impurities within the steel itself will vary within considerable limits.

4. The straightening operations on the starting tube which is stressed at the sections where it is out of true will result in higher mechanicals to start with which are, of course, magnified by the Rockrite compression sizing process.

For the foregoing reasons it would be much safer to count on starting tubes of SAE x 1020 having a yield strength of about 41000 lbs. per sq. inch increased by the Rockrite Process to 80,000. Actually, of course, many of the

tubes will have a yield strength in excess of 100,000, but this should be used as an added factor of safety rather than a predicted strength.

Economics of compression-formed tubing

Compression-formed tubing permits economies by eliminating heavy, slow and costly drilling—saves drills, reduces wear and tear on machine tool, permits faster boring or reaming. Temperature of the work is reduced thereby permitting quick gaging of the work, coolant evaporates more slowly, higher cutting speeds are possible, tools last longer, work-surface finishes are better, and dimensions are more accurate. Output of work pieces is increased as the result of higher cutting speeds, use of forming tools is practicable, operations can often be combined and stations in automatic screw-machines are released. Tube stock weighs less per

RIMAT DIAL BORE GAGES

**FOR PRECISION
MEASUREMENT OF:**

**"O" RING GROOVES
SNAP RING GROOVES
THREAD RELIEFS
ETC.**

**Instantaneous
Readings**



**SIZES
.300" to 6.000"**

**THE ORIGINAL INDICATOR GAGE
DESIGNED FOR MEASUREMENT OF
INTERNAL GROOVE DIAMETERS**

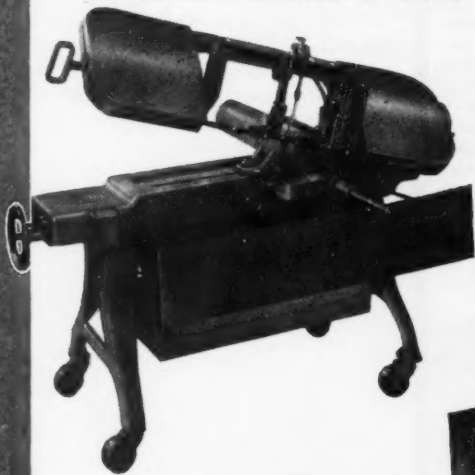
For Information Write To

RIMAT MACHINE TOOL CO., 112J Air Way, Glendale 1, Calif.

WHAT METAL CUTTING CAPACITY DO YOU NEED?

Kalamazoo BAND SAWS

3 SIZES TO MEET YOUR REQUIREMENTS



Intermittant or continuous production cutting model—medium, large, or extra big capacity—you name it, Kalamazoo has it! 3 sizes in both standard and coolant models—a saw for every need.

On the left, the Kalamazoo 816-C (coolant model) takes up to 8" rounds, tubes, pipe; up to 8" x 16" bars and angles. Cuts them fast, smooth, accurately—with no burr, minimum kerf. Also available as Kalamazoo 824 standard or coolant models with 8" round capacity and 8" x 24" flat capacity.

On the right, Kalamazoo Model 610-S—fast, rugged, and accurate, with a host of exclusive features for finer performance. Takes rounds, tubes, and pipe up to 6" diameter, bars and angles up to 6" x 10". Outstanding low-cost saw on the market. Uses any standard motor $\frac{1}{3}$ HP, 110/60/1. Same capacity with coolant equipment as Model 610-C. Write today for complete information on any model.

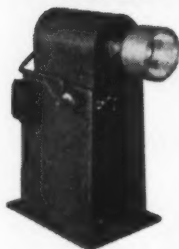


MACHINE TOOL DIV. *Kalamazoo* TANK and SILO CO.

1121 HARRISON ST., KALAMAZOO, MICHIGAN

SCHAUER

SPEED LATHES



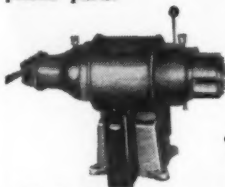
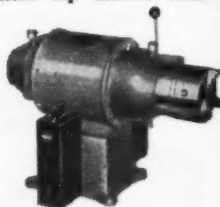
Who Uses Them?

General Electric • Aluminum Co. of America • Studebaker • Thos. A. Edison • Ford Motor • Westing-

house Electric • Owens Illinois Glass • Lockheed Aircraft • Western Gear Works • Bryant Electric • Royal Typewriter • Yale & Towne • Eastern Airlines • Minneapolis Honeywell • Remington Arms • American Locomotive • American Brass . . . and several hundred more top drawer companies!

Why?

Because Schauer Speed Lathes cut from 30% to 90% off the cost of polishing, filing, lapping or de-burring small metal and plastic parts!



• Chuck, collet or vacuum holding fixtures.

- Single speed, two-speed or variable speed models.
- **SAVE WITH SCHAUER!** Write for Bulletin 500.

SCHAUER MANUFACTURING CORP.

Originators of Today's Speed Lathes
2064 Reading Rd., Cincinnati 2, Ohio

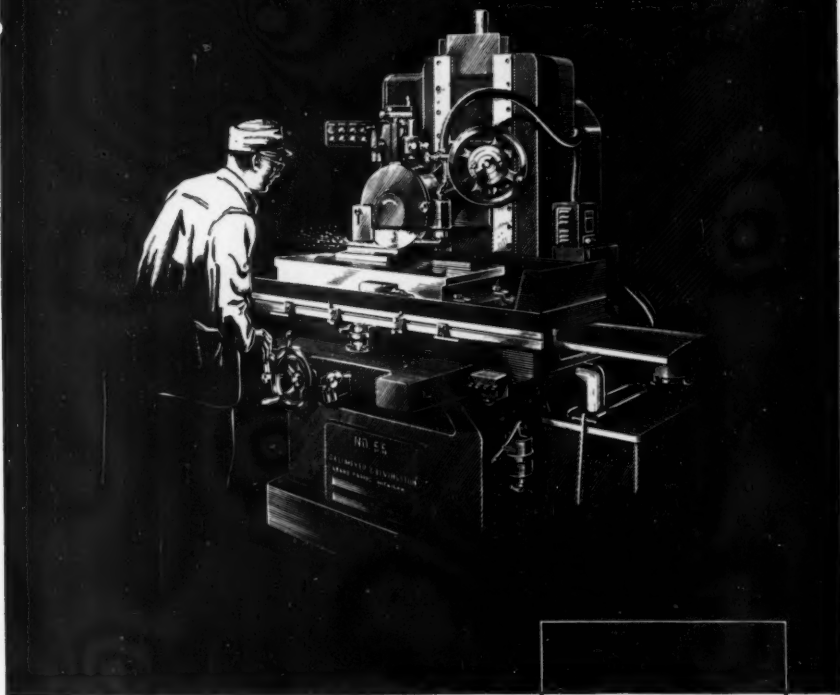
lineal foot, making it easier and less costly to handle, magazines can handle longer lengths and recharging time is reduced, crop losses may be lower, and O.D. or I.D. may require no machining.

Bi-metal tubes are produced by the compression process by passing the telescoped cylinders through the machine. Thus, either the outer or inner surface may be of inexpensive carbon steel and the other surface of copper or a copper alloy. Similar composite tubing can be made of stainless steels, nickel, and other metals to meet special requirements of cost, tensile strength, resistance to corrosion or oxidation, or heat transfer. The compressing-sizing operation of the telescoped tubes presses together the adjoining surfaces of the inner and outer tubes in such a manner as to avoid pockets or voids—this is important for heat-transfer tubing since



"You can remodel it into a dream house for about \$20,000!"

WHEN THE DECISION IS PRECISION...



Where extreme tolerances are not required, the choice of any particular grinding machine may not be too important. But, where absolute precision is demanded, the choice is usually *Grand Rapids*.

Defense orders make it impossible to fill orders as quickly as we desire—but we know our customers can appreciate the reasons for delay. As always we'll do our best to serve you.

GALLMEYER & LIVINGSTON CO.

405 Straight Ave., Grand Rapids, Mich.

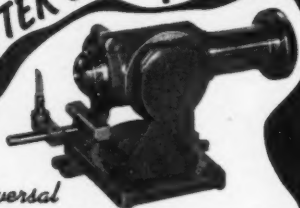
Grand Rapids Grinders

—World's Nest



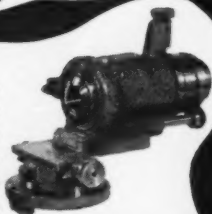
**GALLMEYER
& LIVINGSTON**

NOW! A LOW-COST CUTTER GRINDING FIXTURE



The Universal

CUTTER GRINDING FIXTURE fits any universal tool or surface grinder. The basic unit, shown here (standard accessories not shown), with its four attachments, below, provide a quick and accurate answer to nearly all cutter and tool grinding demands.



Precision BALL END MILL grinding is done with this compact, easily-operated fixture. An exceptionally flexible instrument, it grinds up to 2 1/4" dia., sets at any angles or radius with any cutting clearance on square, conical or ball nose shaped end mills.



◀ The **MULTI-SWIVEL VISE** attachment employs three swivels for quick set-up of any compound angle.



◀ This versatile **INDEXING LOCK BRACKET** may be set up in any position at either end of spindle housing on basic unit.



◀ For precision **GRINDING WHEEL DRESSING** this attachment will handle any two angles as well as set radius.

Send for descriptive literature.
Several good territories in U. S. and Canada
are open to qualified representatives. Write:

**ROCHELEAU
TOOL AND DIE CO.**

650A No. Main St.

Leominster, Mass.

it assures uniform and predictable heat flow.

The possible, and profitable, uses for compression-formed tubing are too numerous to list and rather difficult to define precisely. It is the most practicable process for reducing tubes of certain materials that cannot be drawn through a die, or that can be done so only with great difficulty. It is pre-eminent in diameters of 0.875-in. and over and in heavy walls.

Conclusion

The adaptability of the process is such that tubing of special characteristics is readily made—tubing with high physicals developed through cold-working, or with negligible decarburization, or to critically close tolerances in dimensions, concentricity and lack of ovality. It is most suitable for use as parts of machines and appliances produced in at least fairly large numbers. It is entirely possible that extensive uses for compression-formed tubing are to be found in the manufacture of airplanes and airplane engines, automobiles, motor cycles, refrigerators and washing machines, diesel engines, ball and roller bearings, ferrules, hollow shafting, spindles, sleeves, bushings, hydraulic lines, small pressure cylinders and similar applications.

The End

KENNAMETAL CUTTING TOOLS

for Increased
Productivity



KENNAMETAL Inc LATROBE, PA.

**CEMENTED CARBIDE TOOLS,
BLANKS, MILLING CUTTERS**

Now You Can Have All the
Advantages of Machine Lapping
—at a reasonable price

Only \$1075
For this 24"
Precision Lapping Machine

Flat lapping a pump housing
for an oil-tight seal.

Low in cost — economical to operate and maintain — this new lapping machine is ideal for high precision work both in the tool room and in small lot manufacturing departments. It is a high grade precision machine tool in every respect.

The lapping area is a full 24" in diameter; plates are of close grained cast iron, heat treated and precision ground to ensure permanent flatness. The spindle is roller bearing mounted, and the base construction is of extreme rigidity.

The plates (grooved for flat work or plain

for cylindrical pieces) are interchangeable in only a few minutes time. Plain plate standard; grooved plate \$22.50 extra.

Mail this coupon today for a copy of the Taft-Peirce 24" Rotary Lapping Machine bulletin with detailed information on machine and accessories.

THE TAFT-PEIRCE MANUFACTURING COMPANY
WOONSOCKET, RHODE ISLAND

Please send me a copy of your bulletin on the Taft-Peirce 24" Rotary Lapping Machine.

Name

Company

Street

City State

Mail This Coupon Today!

13,440 HOLES PER

"SKIL PERFORMANCE COUNTS WITH US!"

We've Used 18 SKIL Drills and 2 SKIL Drivers, Hour After
Hour for Six Months with Never a Breakdown..."

**says Harold Johnston of MASTERCRAFT INDUSTRIES,
Rice Lake, Wisconsin**

Mastercraft Industries is now working on a huge government order for oak floor racks to be placed in walk-in meat coolers. Because they are assembled with screws there was a huge drilling problem facing this manufacturer. Mastercraft licked this problem by building their own ingenious multiple drill press, hydraulically operated. This drill press can drill up to 13,440 holes per hour.

Mr. Harold Johnston, who is part owner

of Mastercraft, says, "Without the dependable performance of SKIL Drills we could never have handled this job at a profit. We have already turned out thousands of these floor racks and we have drilled hundreds of thousands of holes with our dependable SKIL Drills. Certainly if anyone has ever job-proved SKIL Drills we have, with constant hour-after hour use during the last 6 months. And during this time we have not had one breakdown."

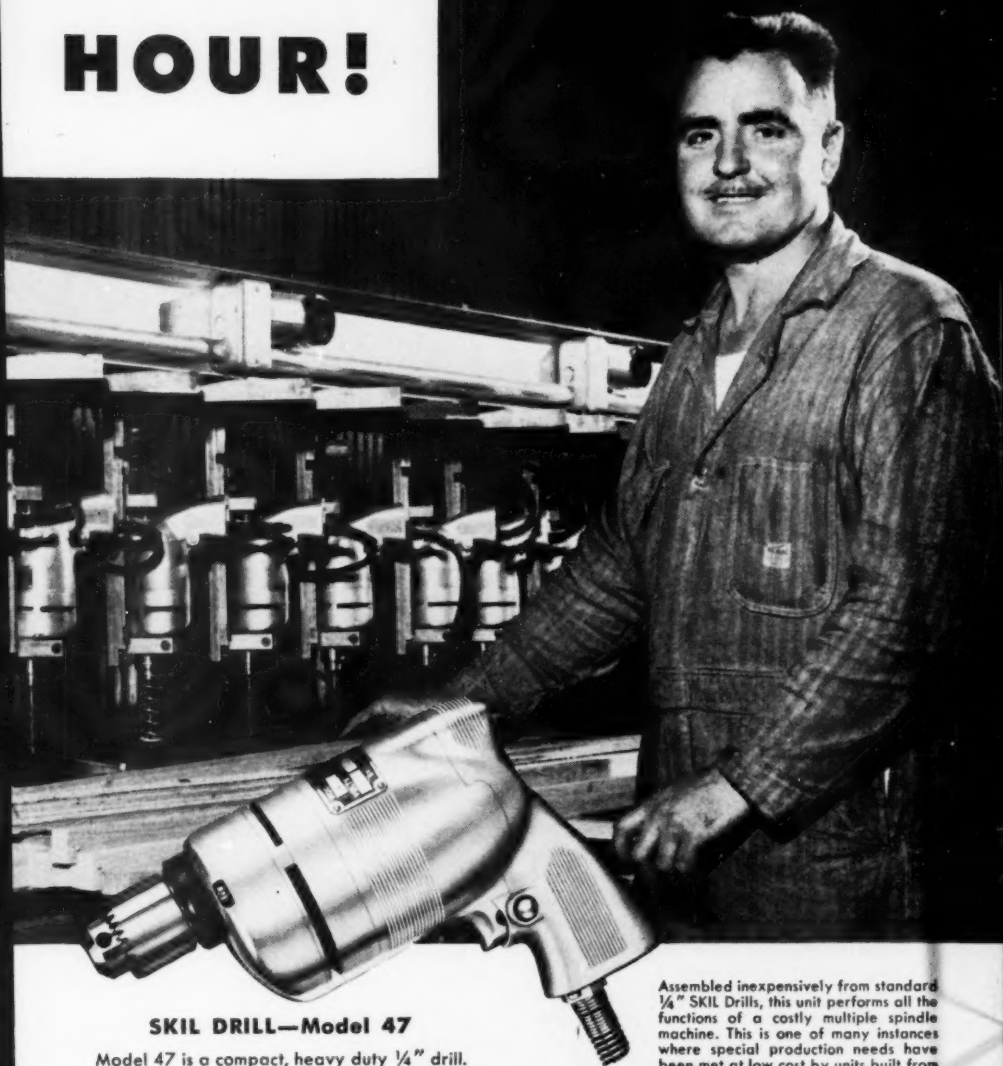


Herb Johnston, part owner of Mastercraft, is here using the Model 304 SKIL Driver. He is driving Phillips head screws into this $\frac{3}{4}$ " oak. SKIL Drivers save hours here!

SKIL

PORTABLE TOOLS

HOUR!



SKIL DRILL—Model 47

Model 47 is a compact, heavy duty $\frac{1}{4}$ " drill. Capacity in steel: 0" to $\frac{1}{4}$ "; in hardwood: 0" to $\frac{1}{2}$ ". No-load speed: 1800 r.p.m. standard. Overall length: 7 $\frac{1}{4}$ ". Weight: 3 $\frac{1}{2}$ lbs. This is one of 26 SKIL Drill models. There's a drill for every requirement.

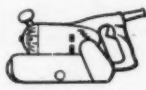
Assembled inexpensively from standard $\frac{1}{4}$ " SKIL Drills, this unit performs all the functions of a costly multiple spindle machine. This is one of many instances where special production needs have been met at low cost by units built from SKIL Portable Tools.

**SKIL Products are made only by Skilsaw, Inc.
5033 Elston Avenue, Chicago 30, Illinois**

Skilsaw Factory Branches in principal cities
In Canada: Skiltools, Ltd., 3601 Dundas St. West, Toronto 9, Ont.



SKIL Saw



SKIL Belt Sander



SKIL Disc Sander



SKIL Driver

Handicapped workers are efficient, loyal ... represent untapped labor market

By Frank Charity

DESPITE all the progress that has been made in the development of fully-automatic machinery, there is still no substitute for the human worker, and handicapped persons represent a reserve source of manpower totaling more than five million men—the only source of such proportions which remains unused in the United States today.

Despite personal sentiments, which must often be disregarded in the operation of a successful business, many manufacturers are obviously reluctant to utilize the services of handicapped persons because this will involve a number of problems which may appear, at first glance, to have no practical solutions. However, experience that has been acquired in this connection by a few companies, such as Goodwill Industries of Los Angeles and Supreme Engineering Corporation of North Hollywood, Calif., apparently proves that handicapped workers, if employed with sufficient discrimination, may be utilized in many circumstances to maintain production work of a type and quality which could not normally be expected from the most perfect physical specimens of humanity.

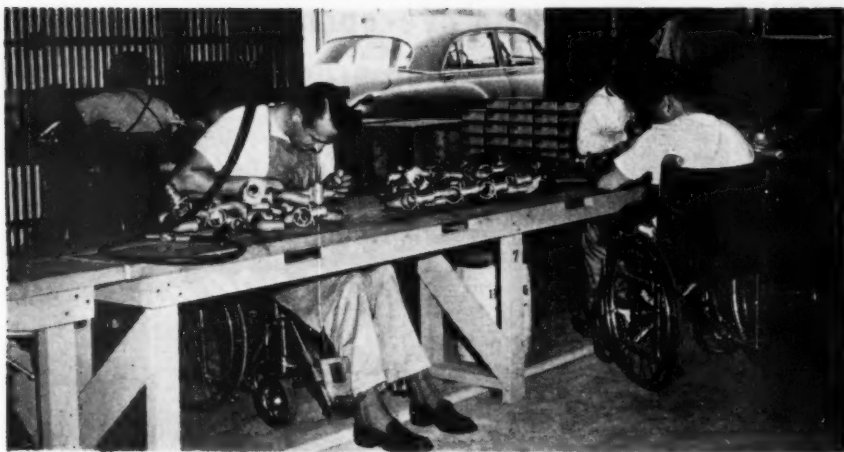
It may be difficult to believe, but according to James Rivers, Supreme

Engineering's president, the man who has lost a couple of arms or legs requires less in the way of "coddling" than the perfectly-normal worker with a scratched finger or blister on his foot.

True, the physical activities of a handicapped person are limited; but, as a rule, he has an earnest desire to work—a tendency to appreciate the opportunity of doing something useful—which is strikingly rare in this day and age, regardless of wages and working conditions.

There is a possibility that legislation in certain cities, counties, or states may limit or prevent the hiring of handicapped workers in certain industries. However, extensive research on the part of this writer has revealed no such restrictions which could be regarded as a serious hindrance.

In California, for example, men or women disabled by industrial accidents may lose pensions by earning more than \$1000 per year; but paraplegic veterans with full-disability benefits and many handicapped persons who receive no compensation can continuously retain full-time jobs without suffering financially.



Plenty of work space is essential to the employment of handicapped persons, such as paraplegics, who utilize wheel chairs; but this doesn't represent a serious problem in most factories.

With artificial limbs and other prosthetic devices, most handicapped workers can travel to and from their places of employment without severe difficulties. However, there are certain limitations in this category which merit consideration.

For instance, where paraplegic veterans and amputees in the aforementioned organizations are able to go from their homes to their jobs without using their legs (by driving their own automobiles, using collapsible wheelchairs, and riding intraplant elevators),

it would be impossible for men who are incapable of walking to make use of stairs in going to their work stations.

Similarly, while handicapped persons may be surprisingly adept in the use of artificial limbs, prosthetic devices are at best poor substitutes for the natural components of the human body and no man should be expected to work with optimum efficiency if his operations involve the constant use of such accessories in production work. For example, a man with an artificial leg may be able to run, dance, or walk without limping;

DU-DRILL

THE MIRACLE DRILL
WITH THE

WELDED

TUNGSTEN-CARBIDE TIP



No Drill Its Equal
In Performance

NO METAL TOO HARD: DU-DRILL positively drills the hardest metals . . . anything between Rockwell C-35 and C-84 it finds easy. DU-DRILL cuts, it does not anneal, burn or melt, making possible highly polished precision holes to tolerance of .0005.
NO MATERIAL TOO ABRASIVE: DU-DRILL stands up to the most abrasive material, metal, or ceramic, as no other drill can.

COFFEY-CUMMINS MFG. CO.

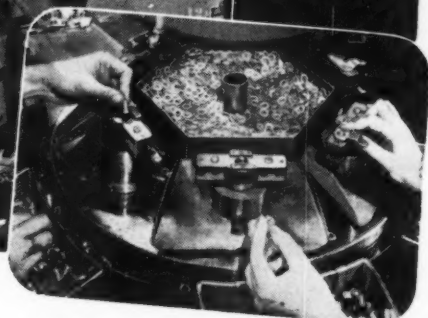
16 North Marengo Ave.
Pasadena 1, California

NEW SOUND MOVIE

tells an eye-opening true story of
cost-slashing production efficiency!



ACTION-PACKED CLOSE-UPS
show how complex 34-piece
unit is assembled at rate of
13,000 daily!



WATCH

MULTIPRESS®

IN ACTION in a space-saving production line that ends lost motion,
cuts noise level, speeds output, and makes the operators' jobs easier!

Here's your chance to see how one of the biggest makers of auto-door latches and similar parts has blown the lid off all previous production records.

You can see how 13 fast-working Denison Multipress units form a complete, highly efficient assembly line in less than 500 square feet of space.

Parts move between stages by the shortest possible routes, on chutes and conveyors. Fast, easy, safe parts-loading is assured by HydroILic Index Tables on 11 of the presses.

You can follow the oil-smooth, controlled accuracy of Multipress in action. You can see why its compactness, versatility and easy operation pay off so well in high production, quality control, lower scrap losses and increased safety.

Show this lively film, at your next meeting, convention, or school program—or at any get-together of shop employees, foremen, or production heads. It's a 16 mm sound-track film cut to 16-minute running time. We'll gladly let you use the film without obligation. If you don't have projection equipment, a Denison representative can handle the entire showing. Write for details.



The Denison Engineering Co.

1184 Dublin Road

Columbus 16, Ohio

How to Get Answers to **TODAY'S** Tap and Drill Problems

IN TOOLING up for work, changed specifications and the use of substitute materials, you may run into difficult tapping or drilling problems. The simplest way out is to put your questions up to Besly's engineering service. Besly men are in daily contact with all types of production... and usually can come up with the *right answer* promptly.

In this way, you can be sure that you will select the most suitable tap or drill for each operation. Besly service-engineers are practical production men. Their experience starts with tool design and covers on-the-job application of the best tap or drill for your work—whether standard or *special*. Besly men can help you to get peak performance and maximum tool life that means *lowest cost per hole*.

UNSURPASSED ACCURACY . . . at all vital points



Microcentric
CHAMFER



Solid Ground
THREAD FORM



"Right"
ROCKWELL



Mirror Finish
FLUTES



Tru-Square
DRIVER



TAPS — the world's most accurate tap.

TWIST DRILLS AND REAMERS — Complete line for every need.

ABRASIVE WHEELS AND DISCS — Individually formulated for your job.



GRINDERS that reduce costs on every type of surface grinding.

CHARLES H. BESLY & COMPANY

118-124 N. Clinton Street

CHICAGO 6, ILLINOIS

Factory: Beloit, Wisconsin



It's New . . . it's FREE!



BESLY TAPPING MANUAL
Contains latest data on tap selection and applications and best tapping procedures. Prepared by shop men for shop men. Tap fits and drill sizes are listed in detail. Write today on your letterhead for a copy.

but if he is obliged to make continuous use of that leg for eight hours daily, he will probably make many mistakes due to fatigue.

However, there are relatively-few industrial jobs in this era which necessitate the complete use of workers' respective physical facilities. A man with one arm may not be very useful as a paper hanger, but he can probably handle a pneumatic spray gun as well as a two-armed worker; a man with two artificial arms may be unable to handle most types of manual controls, but he can make effective use of a foot lever in maintaining operations with a press which is automatically loaded and unloaded; a man with no legs may be

very inefficient as a plant janitor, but he can operate a bench grinder or lathe as efficiently as possible while sitting in a wheelchair; and, at Goodwill Industries, even blind men have been effectively employed in the manufacture of brooms.

In some circumstances, special factory facilities must be provided to assure the effective employment of handicapped workers; but these are not necessarily costly or extensive. For instance, in the Supreme Engineering plant, the employment of some 26 paraplegic veterans has made the following innovations advisable:

(1) The provision of adequate parking facilities for the workers, whose



"There's something I have to tell you, Son, before you start at the bottom in this shop!"



Pick the men who changed to **CIMCOOL**

It's easy to spot the men who changed to Cimcool®—the radically new and different cutting fluid. You'll know them by their broad smiles. Naturally they're happy! For Cimcool covers 85% of all metal cutting operations. And does a *better job!*

This revolutionary cutting fluid—this *chemical emulsion*—replaces all water emulsions and all but a few highly compounded specialty oils. Cimcool permits faster speeds and increases tool life because it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned cutting fluids. It's longer lasting in machines, too. So Cimcool reduces down-time and cuts labor costs for cleaning and changing.

We sincerely believe that one week's run will convince you. And we'll be pleased to provide a demonstration in one of your own machines. Just write us and we'll have one of our Cincinnati Milling-trained machinists call on you. Or, if you prefer, write for our free booklet "Cimcool Gives the Answers." Address, Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

®Trade Mark Reg. U. S. Pat. Off.

*A Production-Proved
Product of*
THE CINCINNATI MILLING
MACHINE CO.



for

85%

OF ALL METAL CUTTING JOBS

"DAVIS" KEYSEATERS



are
moderately
priced
Efficient
Economical
Durable

Built in 3 sizes for cutting keyways 1/16" to 1" width. Circular upon request.

DAVIS KEYSEATER CO.

407 1/2 Exchange St. Rochester 8, N. Y.



Modern automobiles with fully-automatic transmissions, as well as collapsible wheel chairs enable paraplegic veterans and amputees to travel to and from their places of employment without excessive difficulties.

transportation (as previously indicated) is dependent on the use of automobiles.

(2) The use of relatively-large work stations, which allow plenty of room for maneuvering the paraplegic's wheelchairs (each about 30" wide).

(3) The construction of enlarged toilet facilities with wash basins mounted at slightly more than average height on the walls, so that the facilities would be completely accessible to veterans in wheelchairs.

(4) The slight elevation of work benches so that wheel chairs could be readily maneuvered thereunder.

Incidentally, aside from the fact that they have a desirable psychological attitude toward their work, handicapped men have exceptional physical qualifications for certain jobs. A man who

GEORGE L.

Detterbeck Quality Tools

SPEED UP
Screw Machine Production

SELECT
TOOL NEEDS
FROM THIS
LIST

We specialize in
CUTTING CAMS

HIGH SPEED STEEL AND
CARBIDE FORM TOOLS

SPECIAL CUTTING TOOLS

SPLIT DRILL BUSHINGS

CROSS SLIDE ANVIL HOLDERS

TOOL BITS

BOX TOOLS

BURNISHING TOOLS

RECYCLING STOPS

RECESS SWING TOOLS

FORMING SWING TOOLS

Inasmuch as we manufacture cams and tools for the trade we obviously do so on a production basis. As a result we offer:

1. Superior type tools . . . at low cost.

2. Practical design based upon many years of experience.

3. Correct specifications which insure maximum service.

Your tool requirements in our hands is your guarantee of better tools at a great saving.

SERVICE

Let us quote on your tool requirements. You'll save money . . . even as compared with "home made" tools.

Standard circular form tools for B&S and Davenport Machines carried in stock. Immediate delivery.

COMPLETE ENGINEERING

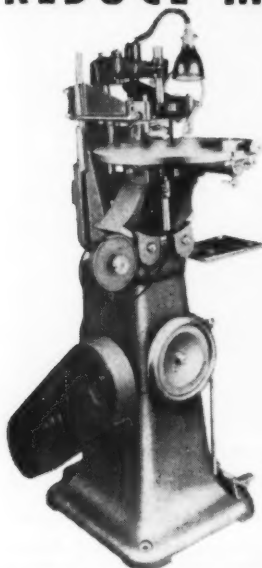
GEORGE L. DETTERBECK CO., Incorporated 1871 Clyburn Ave., Chicago 16, Ill.
ENGINEERS TO AN INDUSTRY

REDUCE MAN-POWER PROBLEMS

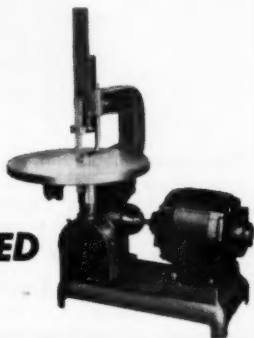
SKILLED LABOR

Is

NOT Required



**WHEN
YOU'RE EQUIPPED
with**



OLIVER DIE MAKING MACHINES

Tried and proven, OLIVER Die Making Machines help lower production costs — so simple to operate that skilled labor is not required . . . this, with their efficiency, speed and accuracy, result in time and cost savings up to 60%. Many OLIVER Die Makers have been in continuous use for more than 25 years. Find out for yourself why plants throughout the Nation are employing thousands of OLIVER Die Making Machines for sawing, filing and lapping operations.

OLIVER DIE MAKERS Available in 5 Models

The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable stroke to 5" with hydraulic feed.

Write today for complete technical data on Oliver Die Makers.

OLIVER INSTRUMENT CO.

1408 E. MAUMEE • ADRIAN, MICHIGAN

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS—DRILL
POINT THINNERS—TEMPLATE
TOOL GRINDERS—FACE MILL
GRINDERS—DIE MAKING MACHINES

**MARK and DEMAGNETIZE
IN
ONE OPERATION**

**THE
Luma
WAY**



The Luma combination etch and demagnetizer etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

Luma Electric Equipment Co.
P. O. BOX 132-H TOLEDO, 1, OHIO

FLYNN

**FOR OVER 30
YEARS THE
PREFERRED
OFFSET
BORING HEAD**



*Write
for Catalog*

RIGID • ACCURATE • SAFE

- Ground micrometer offset screw.
- Large, easy-to-read graduated dial.
- "V" tool block, hardened, ground.

A model for practically every tool room and production operation.

FLYNN MANUFACTURING CO.

417 BATES STREET N. DETROIT 36 MICHIGAN



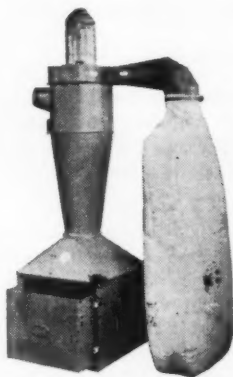
This man, a former chief petty officer in the U. S. Navy, is an exceptionally good inspector—despite the fact that he cannot use his legs—because he attained extensive technological training at Uncle Sam's expense, and because he shares with other handicapped persons an unusual desire to make himself useful. His salary doesn't equal the \$6500 taxpayers would expend if he were confined to a government hospital; but he's earning a good living, and he's spent enough time in a veterans' hospital to appreciate the advantages of a job and self-sufficiency.

has learned to navigate a wheelchair without assistance is, for example, inclined to have better arm muscles than a normal worker and will not take every opportunity to wander away from his work station.

On-the-job training is, of course, essential to the effective use of any person who lacks practical experience; but, due to the mechanized nature of our armed forces, it is now possible to



**You've got the "Number"
on Abrasive Dusts when
You Use **TORIT**
DUST SEPARATORS**



Here you are folks. Step right up and watch the sparks and dust go 'round and 'round. Off the wheel they fly, but not into machinist's eyes.

You hold the winning number when dust-creating machines are equipped with Torit Dust Separators. Compact and powerful, they trap dust at its source. Heavy particles are removed by centrifugal action and, with after-filter as shown, the remainder is cleaned to permit recirculation of the air.

Keep production spinning with Torit dust collecting equipment. There are models and sizes for every standard machine. For complete information and latest Torit catalog, write:

TORIT

Manufacturing Co.

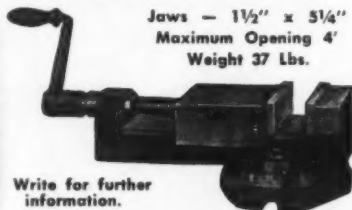
303 Walnut Street

St. Paul 2, Minn.

NEW BRITAIN

SWIVEL VISE

Jaws — $1\frac{1}{2}$ " x $3\frac{1}{4}$ "
Maximum Opening 4"
Weight 37 Lbs.



Write for further
information.

The body is made of semi-steel; the jaws of tool steel hardened and ground. All working surfaces are ground. The vise is as accurate as is possible and the degrees are cut to very close limits.

NEW BRITAIN TOOL & MFG. CO.

NEW BRITAIN, CONN., U. S. A.

STERLING DRILL GRINDER



CAPACITY:

$\frac{3}{8}$ " to $2\frac{1}{2}$ " drills.
5" x 9" adjustable table.

MOTOR: $\frac{1}{2}$ hp,
3450 rpm.

NET WT: 250 lbs.

CRATED: 320 lbs.

McDONOUGH MANUFACTURING CO.

EAU CLAIRE, WISCONSIN, U. S. A.



Men with prosthetic arms can handle their own cigarettes and perform many manual tasks of persons with natural arms, but their successful employment depends on the principal use of their natural facilities; for example, their abilities to use their heads (in supervisory work); their eyes (in inspection work); and their legs (in the operation of pedal-controlled machines, etc.).

obtain the services of many disabled veterans who have had extensive training and experience in the use of the most modern types of machines and tools.

Long lists stating the names and qualifications of men in the latter category can be obtained from veterans' hospitals in virtually every section of the United States; and, while it now seems unlikely that anything will greatly reduce federal taxes in the immediate future, it is worth noting that Uncle Sam saves an estimated \$6500 annually in hospitalization costs each time the acquisition of a job enables a veteran to become self-supporting.

The End

CONTROL POWER *BETTER*

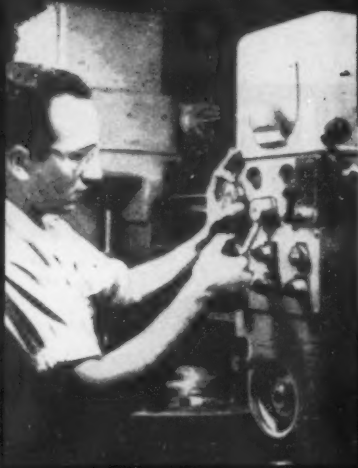


Get the **RIGHT** Clutch for **YOUR** Need

There is no one stock answer to every power transmission control problem. That is why **ROCKFORD** clutch engineers can be of practical help in designing an application that will increase your product's efficiency—make a substantial saving in cost and reduce servicing down-time. Send a print or description of your need for their recommendations, based on the extensive **ROCKFORD** line of clutches, power take-offs and speed reducers.

ROCKFORD CLUTCH DIVISION
BORG-WARNER
1309 Eighteenth Ave., Rockford, Illinois

ROCKFORD CLUTCHES



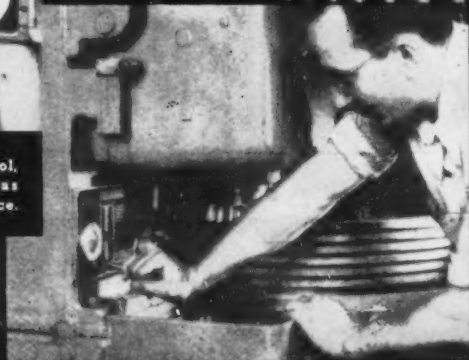
Quick Changes

STROKES PER MINUTE

Simple shift levers change cutter-strokes-per-minute in seconds. 19 changes available.



DEPTH OF CUT Dial control, graduated in thousandths, is as quickly adjusted, and locked in place.

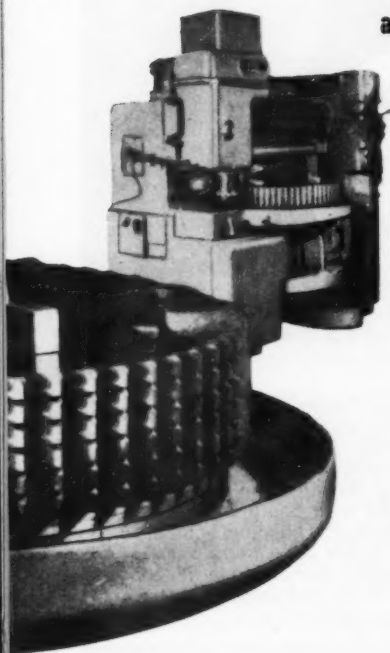


ROTARY FEED A quick change gear-shift selection of 4 rotary feeds—with 8 (or more) additional feeds by changing two "pick-off" gears.

..in Feeds and Speeds

A SPUR TO TOP EFFICIENCY

On Short-Run Production the 36-Type Gear Shaper's 'Gear Shift' Controls make it simple and easy to rough and finish at maximum feeds and speeds.



The simplicity of control and operating convenience of the 36-Type Gear Shaper actually encourages record performance on different-sized blanks—as here pictured on sprocket cutting at Silent Hoist & Crane Company's Brooklyn (N.Y.) Plant. . . All in all it takes no more than 25 seconds to change settings for (1) cutter strokes per minute (2) depth of cut and (3) rotary feed.

←Note how the blanks (for 7/8" roller chains) are stacked 6-high, to take advantage of the full 6 inch face width capacity of the 36-Type Gear Shaper. Typical feed and speed data for roughing and finishing cuts follows:

	1st Roughing Cut	2nd Roughing Cut	Finishing Cut
Splt. 28.00" O.D.			
4110 steel, 37 teeth, Depth cut .550"	Depth cut .550"	Depth cut .140"	Depth cut .175"
1.5" c.p., 1" face width Feed .021"	Feed .021"	Feed .0408"	Feed .0408"
5 pieces stacked Strokes p.m. 41	Strokes p.m. 41	Strokes p.m. 59	Strokes p.m. 59
Splt. 32.867" O.D.			
1040 steel, 67 teeth, Depth cut .600"	Depth cut .350"	Depth cut .350"	Depth cut .350"
1.5" c.p., 29/32" f.w. Feed .021"	Feed .032"	Feed .032"	Feed .027"
6 pieces stacked Strokes p.m. 41	Strokes p.m. 41	Strokes p.m. 41	Strokes p.m. 41

The same advantage in quick flexibility of control applies irrespective of the diameter and pitch of the work—with the same overall advantages of low production costs and cutter economy. . . Precision quality of the work done can be held to any desired limits.

It's time to modernize! Your requirements in heavy duty gear cutting will profit by early investigation of the 36-Type Fellows Gear Shaper. For a catalog or a call, get in touch with the nearest Fellows Office.

Fellows

THE FELLOWS GEAR SHAPER COMPANY • Head Office and Export Department • 78 River Street, Springfield, Vermont
Branch Offices: 616 Fisher Bldg., Detroit 2 • 5835 West North Avenue, Chicago 39 • 2206 Empire State Bldg., New York 1

South Bend 14½" x 5' Quick Change Gear Precision Lathe

**SOUTH
BEND**

14½" LATHES

FOR FAST, PRECISION MACHINING

SPECIFICATIONS

Swing over bed and saddle . . . 14-5/8"
 Distance between centers 24½ to 60½"
 Maximum Collet Capacity 1"
 Spindle Speeds . . . 8—27 to 800 r.p.m.
 Power Longitudinal Feeds, 48 R. H. or
 L. H.0015 to .0841"
 Power Cross Feeds . . 48, .0006 to .0312"
 Thread Cutting, 48 R. H. or L. H. pitches
 4 to 224 per inch

South Bend 14½" Lathes offer many advantages for precision machining. Ease of operation, speed, power, accuracy, and efficiency are some of the features responsible for their popularity. Often the precision and quality of finish obtained with South Bend Lathes are such that subsequent grinding, honing, or lapping operations are unnecessary. Substantial savings in capital investment, power consumption, floor space, and labor costs have resulted from their installation.

SEND INFORMATION CHECKED:



☐ 9" and 10"
BENCH LATHES



☐ 10" to 16-34"
FLOOR LATHES



☐ ½" and 1" Collet
TURRET LATHES



☐ 14"
DRILL PRESSES



☐ 3"
BENCH SHAPERS

Name _____

Company _____

Street _____

City & State _____

Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana





Foremanship Forum

How to evaluate your supervisors' training program

by Edmund Mottershead

"SUPERVISOR training is wonderful, but how much good does it do?" Consultants such as ourselves, facing this question in many different industries, many times a month, can come up with only one honest answer: "We don't know."

If the question were worded, "What good is supervisory training?" we could say: "It strengthens the management team; it builds leaders; it reduces turnover; it increases production; it reduces absenteeism; it reduces accidents; it makes better employee relations; it makes better customer relations; it can do almost anything you want it to!"

The stinger in the first question is two words: HOW MUCH?

If an organization trains 20 stenographers, for example, gives them lessons in typing, a measureable reduction in typing errors can be noted along with a measureable increase in letters typed per week for the group of 20 girls. If an organization gives special training to workers on an assembly line, a measureable increase in production can be noted. The point is that these specific applications are applications of "direct training" to a single situation with all

other elements in the situation unchanged. In a sense, these are what the research worker calls "control groups."

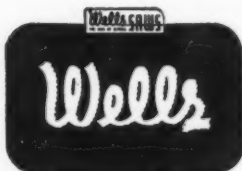
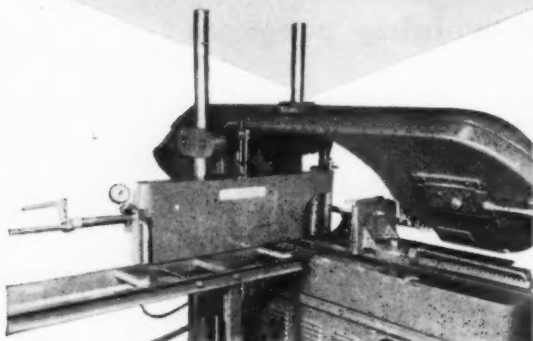
In some instances a comparative measurements of supervisory training can be obtained by giving training to one selected group of supervisors and withholding it from another group, and then checking on performance in the two groups over a period of time. Again, the supervisors who did not get the training might be better supervisors than the trainees so that the record would not show appreciable differences. In individual instances, some effort can be made to measure results in terms of dollars. We know, for example, that the average cost of replacing a clerical worker such as a file clerk or typist is between \$200 and \$225.00. One company which recently applied a special type of training in getting cooperation to 145 supervisors asked their supervisors to report how many times they had applied the "method" in one month. The average was 4.6 applications. Multiply that on the basis of a definite technique of getting cooperation. The turnover rate in that company was roughly 10% per month. In other words,

**For
repetitive
cutting...**

**THIS COMBINATION SAVES
TIME AND MONEY**

ANY quantity of identical lengths of bar stock are cut automatically in a Wells No. 12 Heavy Duty Metal Cutting Band Saw equipped with a Wells-O-Bar Feed Master.

In operation, the cutting head of the saw descends at a rate governed by a predetermined blade pressure setting. At the completion of each cut, the head automatically rises to a preset height and the stock is automatically projected for the next cut. The machine requires no attention except for reloading. Ask your Wells Dealer for complete information or write direct.



Products by Wells are Practical

**METAL CUTTING
BAND SAWS**

WELLS MANUFACTURING CORPORATION
707 COOLIDGE AVE., THREE RIVERS, MICH.

the normal expectancy was that 67 employees from that group would be replaced in one month. Assuming that because of these contacts the employees did not leave (which some did), the training saved directly a matter of \$13,400 or so. Sixteen (16) supervisors did report that they were able to "salvage" employees on the verge of leaving, a demonstrable saving of \$3,200.00. However, the answer to "HOW MUCH?" is still not very definite.

Methods of measurement in use:

The answer for management to the question of "How much good does training do?" lies in long range changes in the organizational picture, in long range changes in employee attitude and performance. For the immediate purpose of evaluating a training program which has just been undertaken or completed, most companies find it necessary to rely on three things:



Courtesy Arnolt Co., Warsaw, Ind.

Here's an "on-the-spot" answer to push-pull and rotary control problems. As shown above, with only a single S.S.White flexible shaft, the light can be swung 360° or tilted up or down simply by turning the control knob or by moving it in or out.

In addition to the obvious advantages of this arrangement, the S.S.White flexible shaft is easily installed and allows both the light and control knob to be mounted in the most desirable location.

BULLETIN 5008 gives essential facts and data on flexible shafts and tells how to select and apply them. Write for your free copy.



THE S.S. White INDUSTRIAL DIVISION
DENTAL MFG. CO.



Dept. H, 10 East 40th St.
 NEW YORK 16, N. Y.

WESTERN DISTRICT OFFICE: Times Building, Long Beach, California

NOW there are **THREE**



in the **WALTON FAMILY**

The Walton Company has added Walton-American Tool Holders to its line of time- and labor-saving tools — the well known Walton Tap Extractor and its companion Reqs Pipe and Stud Extractor.



WALTON TAP EXTRACTORS

Universally used for removing stubborn, balky taps that break off deep in threaded work. Quick, easy, inexpensive. Will not damage threads.

WALTON-AMERICAN TOOL HOLDERS

Many holders in one. Head will swivel around an entire circle. May be set for straight, right or left-hand offset positions. Will hold with perfect grip any size square or round tool bit or boring bar.



REPS PIPE AND STUD EXTRACTORS

When faced with broken pipes or studs that defy movement—here's the tool. Makes a strong, four-point grip without need for hammering or pounding. Hardened steel—will remove any material.

SEND FOR NEW CATALOG
OF WALTON TOOLS

THE WALTON COMPANY
Dept. 12, Hartford 10, Conn.

Please send your new catalog of Walton Tools with full details of free trial offer.

Name

Street

City State

1. Attendance records
2. Participation records
3. Comments from supervisors

Attendance records

Attendance records are some measure of the success of a given program in that they are evidence of interest on the part of those participating. In the case cited above, for example, 12 groups of supervisors participated. Over-all attendance for the 145 supervisors was 91.52%. Average attendance per group per meeting was 10.4 persons. Eleven (11) persons dropped out or never showed up for reasons of business, vacation, health, etc. The breakdown by groups were as follows:

Group:	En-rolled:	Average age:	People in Group:
A	14	11.6	Mixed, lower level supervisors
B	15	13.8	Mixed, lower level supervisors
C	14	13.2	Mixed, lower level supervisors
D	15	11.8	Mixed, lower level supervisors
E	10	10.0	Women, lower level
F	9	7.4	Top level executives
G	11	11.0	Women, lower level
H	12	10.08	Men, lower level
I	8	6.4	Top level executives
J	9	7.8	Men, mixed levels
K	13	11.8	Men, mixed levels
L	11	10.1	Men, mixed levels

Participation records

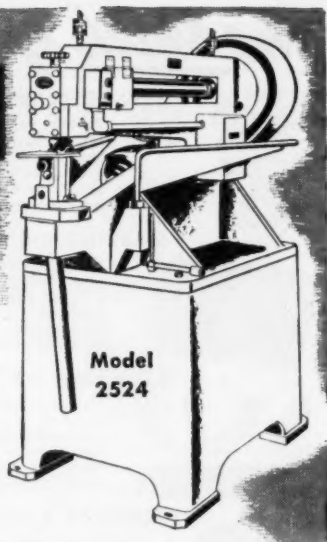
Participation records form, for the conference leader or training director, part of a normal attendance record. Some space is usually provided on the attendance record for "cases brought in" problems discussed, examples of technique explored, comments and questions by each member of the group, to indicate to some degree his or her relative participation in the group. Evidence accumulated on the above example, for instance showed that on the average each person asked 4.4 questions per session, made 3.2 comments per session, brought in 1 or more cases, and in the course of 5 sessions put on two demonstrations of the particular technique being developed and studied. However, more than half of the group sat around and said nothing most of the time. In each group two or three individuals did most of the talking, provided most of the problems and discussion. Consequently, detailed examination of the record shows that only approximately 40% of the members of

CAMPBELL

NIBBLING MACHINES

**Cut odd shapes
from sheet stock
faster—**

**SPEED UP
PRODUCTION**



- For ferrous or non-ferrous metals. Work feeds in any direction. Many models, all re-engineered...ready for the emergency.

See us at Booth A-342 Metal Show, Detroit

ACCO

*Tell us your problem—
we'll make recommendations*



**CAMPBELL MACHINE DIVISION
AMERICAN CHAIN & CABLE**

937 Connecticut Ave., Bridgeport, Conn.

the group benefited sufficiently from the program to let management feel sure that the technique developed would be put to use. An accurate record of participation is one indication of the results obtained by training.

Comments of individuals

Individual comments of supervisors explaining just what they "got out of the course" of training are perhaps the most valuable guide to the effectiveness

of the training. It is a reasonable assumption that a group of foremen and supervisors of from 2 to 25 years experience are not just a bunch of dummies. If they seriously feel that they got some benefit and specify what benefit, management has a guide to what is being accomplished. In the case cited previously, comments were received from 90 or so supervisors, some of which were:

"I got a workable technique on how

MARKING TOOLS TO GIVE YOUR PRODUCT

The Mark of QUALITY!



TYPE HOLDERS AND STEEL TYPE

Parker precision press and hand marking type holders are engineered for quick, accurate interchangeability of type. This is furnished in all standard character sizes from 3/64" to 1/4" or in special type and symbols to your specifications.



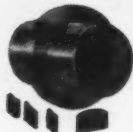
MARKING DIE FOR AZIMUTH SCALE

Sharp, clean, raised 1" increments and a double row of perfect figures, from 10 to 170 in this semi-circular azimuth scale all hardened into a solid tool steel block. Parker dies cost less because they perform perfectly—longer.



STANDARD OR SPECIAL STAMPS

Parker steel trade mark, identification, part number or inspection stamps are made in dozens of standard shapes and designs. Special stamps in any quantity, any size to mark any material are also manufactured to your specifications.



REMOVABLE INSERT MARKING DIES

This removable segment die is used for stamping and coding military shell cases. Here one die replaces three used previously and eliminates two stamping operations, thereby decreasing marking cost by over 60%. Another application of Parker experience and craftsmanship.

**SEND FOR THE PARKER
BLUE BOOK TODAY**

**INVESTIGATE THE FLEXIBILITY
OF PARKER'S FACILITIES TODAY!**



to handle people."

"I believe I received assistance in better organizing my thoughts and words in discussions with employees."

"Got a good technique which I can use. Particularly ideas of cooperation between departments."

"I got some good ideas and had a good time."

"Interesting and instructive."

The point is that the comments made, if analyzed, are some measure of how much the individual got from the training. The man who "got some good ideas" probably got much less than the man who "received assistance in organizing his thoughts, etc."

Other methods of evaluating training programs

Other methods of evaluating the re-

New! Model B800 Series TOOL and CUTTER GRINDERS



MODEL
B800

Four
New Improved
Models
of the
Tool and Cutter
Grinders
Available Now!

*Distributed
Only Through
Franchise
Dealers*

K. O. LEE CO.
ABERDEEN, S. D.

See Your
Authorized
"K-O"
Distributor
Or Write
For
Descriptive
Literature

sults of supervisor training programs include the reaction survey, the use of test groups, and the use of tests or examinations on a "pre-test and after-test" basis.

Reaction surveys have been found to be useful tools in measuring the effectiveness of training programs. A great deal of information otherwise unobtainable except in a general way is thus revealed, and a statistical basis for conclusions is established which is use-

ful in presenting conclusions to management.

In the case cited above, a reaction survey was used during the last half hour of the 5th (final) session of the program. A copy is shown on the following page.

As evidence of the success of the program, and also to help in making plans for future programs, the organization's 145 supervisors reported about as follows:

Drill Hardened Steels without Annealing -



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counter-boring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

**You Harden It—We'll Drill It—
With "HARDSTEEL"**

BLACK DRILL COMPANY

Division Black Industries

1374 East 222nd St. • Cleveland 17, Ohio

Also makers of—
**BLACK DRILLING
UNITS—AUTOMATIC,
SELF-CONTAINED—
FOR COST-CUTTING
PRODUCTION ON
ALL MATERIALS**

Write for information

125 persons completed the training evaluation questionnaire.

On Question 1: "What did you get out of the recent conferences?"

0 replied "Nothing"

0 replied "Had a good time"

44 replied "Got some good ideas"

81 replied "Got a workable technique I can use."

On Question 2: willingness to participate in additional training:

1 replied "If I have to."

1 replied "If the other men do."

26 replied "Yes, on Company time."

97 replied "Yes, on my own time."

Other questions can be formulated for such a questionnaire to bring out whatever information is desired. The important thing to bear in mind is to make sure that the members of the group understand the purpose of the evaluation sheet, that they understand exactly what each item means, so that they can put down accurate information.

Test groups

The use of test groups in supervisory training is of primary value in making

Less Labor— More Work—Bigger Profits **QUADRILL & QUAD-TAPPER**

**Increase
Production
33%**

**Fits
Directly
on Drill
Press**



- Uses up to 4 drills and taper on single press
- Saves moving of jig from one press to another
- Drills to full capacity of press
- Costs less than a drill press — does the work of 4
- A thoroughly PROVEN tool. Thousands in use.

Investigate this important work-saver. Write for literature today.

CHICAGO QUADRILL CO.

4528 W. ADDISON ST. • CHICAGO 41, ILL.

the training itself more effective. Test groups where one group receives training and another does not may indicate effectiveness of training up to a point, but so many other factors enter into the picture that this is difficult to prove conclusively.

In the case cited, a test was made as to the composition of the groups. The attendance record, for example, indicates clearly certain facts as to who has the most regular attendance, and why. It was discovered preferably to have groups mixed of both men and women. In this particular program it

was also discovered to be better practice to have groups of similar levels of experience and authority.

Constant use of test groups will help at all times in making training more effective.

Tests and examinations

Where a specific skill, for example, skill in instruction, skill in handling a grievance, or where a specific body of knowledge such as the facts concerning management policies, is involved, it is entirely feasible to pre-test and

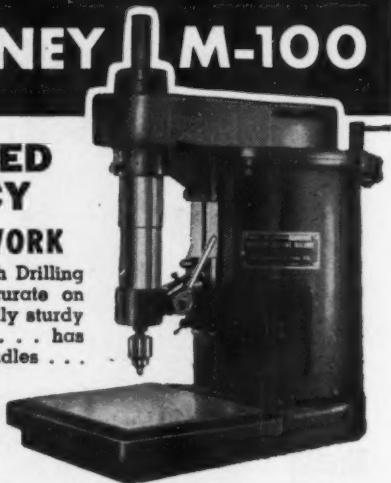
SIGOURNEY M-100

MAINTAINED ACCURACY

IN PRECISION WORK

The Sigourney M-100 Bench Drilling Machine is extremely accurate on precision jobs. It is unusually sturdy and rigid in construction . . . has hardened and ground spindles . . . and sealed ball bearings throughout. All moving parts are entirely closed for maximum operator safety. M-100 is built for long and steady service.

This sturdily constructed bench drilling machine is available in 1, 2, 3 and 4 spindle models . . . speeds from 4,000 to 10,000 r.p.m.



Send for illustrated bulletin

THE SIGOURNEY TOOL CO.
Hartford 6, Conn.



Sole Sales Agents

PRATT & WHITNEY

Division Niles - Bement - Pond Co.

West Hartford, Connecticut

after-test your group to discover gains in knowledge and/or ability.

The use of pre-test devices in order to determine in advance how much the group knows so as to fix the burden of instruction is by no means new. In job instruction it has long been stressed: "Find out how much he already knows." However, as a basis for comparison, the pre-test is frequently overlooked.

Where the subject matter is sufficiently detailed and technical, the evidence collected in many instances indicates that written examinations are not without value. However, it must be made clear that the purpose of the

examination is not to "pass" or "fail" anyone, but to make sure that the information has gotten across to the group and to make sure that they know what they should know.

Some general comments

Have a single objective

In any attempt to evaluate the results of supervisor training, one thing should be borne in mind: have a single objective for the program, and keep the other factors in the problem as nearly constant as possible if true measurement is to be obtained. You cannot

STOP making your own punches

WE'LL MAKE ANY PUNCH AT A PRICE BELOW YOUR OWN COST!

pivot punch

precision punches for EVERY purpose from ONE dependable source

More than 276,000,000 Standard Sizes and Types at Standard Prices

pivot punch
DIVISION OF PIVOT PUNCH AND DIE CORPORATION
KENT, OHIO

- The only one stop Punch Source.
- More than a Punch. It's a Punch Service!
- No Need to Stop to Standardize. 276,000,000 sizes and styles at standard catalog prices. No hidden prices for "in-Between" Sizes.
- Any Type of Punch in a Choice of Four Qualities. A punch for every purpose — a punch for every cost at prices below your own cost to manufacture.

SEND FOR NEW FREE CATALOG. WRITE DEPT. 4

ONE SOURCE FOR ALL OF YOUR PUNCHES

pivot punch
DIVISION OF PIVOT PUNCH AND DIE CORPORATION
KENT, OHIO

measure all the factors in the situation at once. One objective for one training "package."

Check up periodically

Make evaluations of training results frequently, and at regular intervals. Don't wait three years to find out if you are getting results. Check up at the end of every program, at the end of each 2 or 3 month period. It is frequently discovered necessary to change plans in the midst of things. Remember that the force of inertia applies to training as to other things, and that it is much harder to stop a program than to keep

it going indefinitely without improvement.

Ask for suggestions and criticisms

The members of the group have years of experience and a great deal of common sense, in most instances. They have definite ideas as to how to make discussions more useful to themselves. They after all are closer to their individual problems than the superintendent, than the personnel director or the training man who is running the meetings. They want above all something they can take right out into the shop and USE.



"LOOK HOW RUDOLPH'S OUTPUT HAS INCREASED SINCE THEY CHANGED TO THE RIGHT CUTTING FLUID!"

IN A TEST on Gleason Revacycles in a large gear department Stuart's SpeedKut "A" increased output from 1200 to 3200 gears per tool grind and reduced stock removal, when regrounding cutters, from .009" to .0035". Let a Stuart Representative help you.

Are you receiving Stuart's SHOP NOTEBOOK regularly? Write, wire or phone.

D. A. Stuart Oil co.

2749 South Troy Street, Chicago 23, Illinois

Get them to make suggestions. Tell them you want training to be as useful as possible and that you need their help in accomplishing this. Get them to make their suggestions in writing, for example on the blank backside of a training evaluation form.

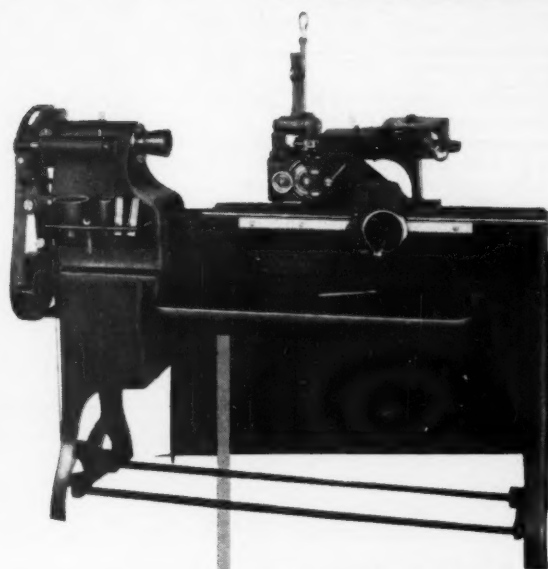
Dollars and cents

It cost from \$200 to \$225 to replace an unskilled worker or clerical worker. Skilled workers such as machinists, toolmakers, heat-treating specialists,

master sheet metal workers, and the like, represent individual investments on the part of their employers running into the thousands of dollars. The direct cost of replacing people is one of the greatest single cost factors at the present time.

There is no question but that the strength of an organization is its people. The strength of the people lies in the supervisory and executive staff. And it requires constant training to keep that supervisory team functioning at its

Hanson-Whitney Rapid Precision Centering Machine



**a machine
you can use!**

**a price
you can pay!**

**delivery
you'll like!**

Here's the machine that precision centers almost any part with a machined finish — round, square, ball-ended, tapered — up to $3\frac{1}{4}$ " diameter. A variety of parts machined from the bar on automatics or semi-automatics can thus be centered quickly, accurately for subsequent grinding, milling, or special threading operations.

Centers are first drilled and then shaved, on one side only, to insure absolute accuracy, an operating feature that reduces the amount of stock allowed for finishing operations. A simple treadle arrangement leaves operator's hands free for speedy work handling.

This efficiently designed machine costs little, delivers the work fast. A note on your company letterhead brings an 8-page detailed bulletin by return mail.

HANSON-WHITNEY COMPANY • HARTFORD 2, CONN. • DIVISION OF THE WHITNEY CHAIN COMPANY



SUPERVISORY TRAINING EVALUATION

NAME: _____ DATE: _____

DEPARTMENT: _____ POSITION: _____

The purpose of this report is to get specific and detailed reaction from every supervisor who underwent the recent series of training conferences so that the results of such training may be evaluated and future training programs planned to obtain the maximum benefit for the entire organization.

Check the reactions which most nearly fit your own in answering the questions. Do not hesitate to write in detailed explanations wherever you wish.

1. What did you get out of the recent series of 5 conferences on cooperation?

- a. Nothing b. Had a good time. c. Got a few good ideas. d. Got a good workable technique I can use.

Explain: _____

2. Would you willingly participate in additional training programs of a similar nature covering other topics, other personnel and management problems?

- a. No b. If I have to. c. If the other men do. d. Yes. On company time.
e. Yes. On my own time if need be.

COMMENT: _____

3. Have you made any effort so far to apply the principles developed in the series of conferences?

- a. No b. One or two. c. Several d. Many, and will continue to use the method.

4. Allowing for vacations and other normal work interruptions, how much time would you feel willing to devote to such meetings as this?

- a. None b. 1 meeting a week, 5 meeting series, about 2 such series a year. c. 1 meeting a week, 10 or 12 week programs, about 2 such a year. d. 1 meeting a week, every week, with suitable programs.
e. Two meetings a week, or as often as necessary to get it all in.

5. Considering the needs for additional supervisor training brought out in these conferences, indicate your 1st, 2nd, and 3rd choice for the next type of training to be undertaken.

- | | |
|----------------------------------|-----------------------------------|
| _____ Job Instructor Training | _____ Job Relations Training |
| _____ Job Relations Training | _____ Effective Speaking and |
| _____ Conference Techniques and | _____ Human Relations |
| _____ Leadership Training | _____ Conferences on Organization |
| _____ Conferences on Utilization | _____ Conferences on Policy |
| _____ of manpower | _____ Conferences on Grievances |
| _____ Public Speaking | _____ Conferences on Discipline |

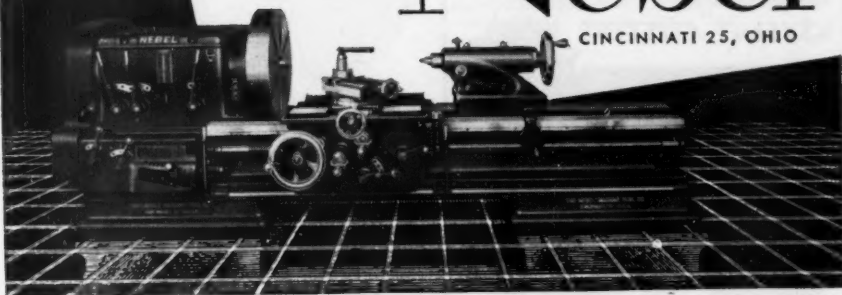
**Get the
BIG
ECONOMY
SIZE**

Get

Nebel

CINCINNATI 25, OHIO

Every lathe in the Nebel line gives you more per dollar expended . . . but the big swing engine, gap and extension bed gap lathes are absolutely the biggest values in basic, time-tested metal-turning facilities. Send today for descriptive bulletins.



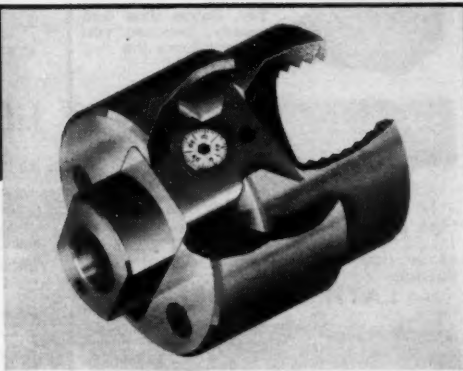
**SAMSON
Offset
BORING CHUCKS**

**THESE JOB-PROVEN FEATURES WILL
SAVE YOU TIME AND MONEY**

- Quick tool change
- Positive dead-centering
- Precision offset adjustment
- Rugged tool support
- Safety round contour

**Complete Boring Chuck
Accessories Available**

WRITE FOR COMPLETE DETAILS



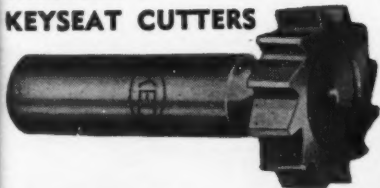
**FAMOUS
LAST WORD
WHEEL
DRESSER**



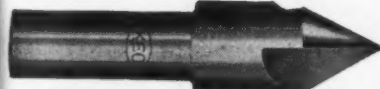
LAST WORD SALES CO. • 18500 Mt. Elliott • Detroit 34, Mich.

KEO**CENTER DRILLS**

Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

KEYSEAT CUTTERS

High speed. Right hand. $\frac{1}{4}$ " shank. Diameter from $\frac{1}{4}$ " to $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

**CENTER REAMERS**

High speed steel. Reamers from $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made to your specifications.

LATHE MANDRELS

Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from $\frac{3}{16}$ " to 1" are .0005" undersize at small end, from $\frac{1}{4}$ " to 3", .001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

highest possible level of efficiency.

Training for foremen and supervisors gets results in terms of better employee relations, greater individual productivity, lower costs. It does a lot of good in many ways, but how much? In dollars and cents and statistics, we still don't know.

The End



G. L. Lucas

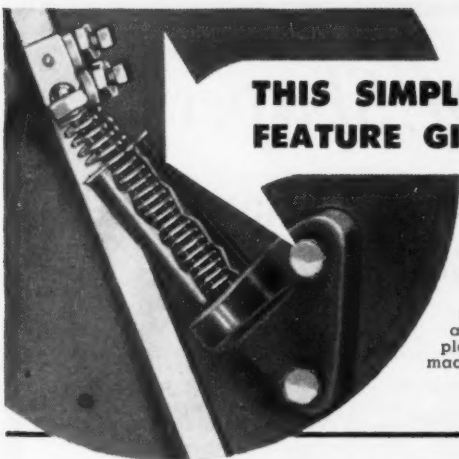
"Engineering sends this cigar and wants to know would you be good enough to read these specs?"

New NESTING TYPE TOTE PANS

20" Long x 12" Wide x $\frac{6}{4}$ " Deep
16 Ga., drag holes, handles both ends.



J. L. LUCAS & SON, INC.
BRIDGEPORT 5. CONN.



THIS SIMPLE, SURE-ACTION FEATURE GIVES EXTRA SAFETY

JOHNSON puts the exclusive **SAFETY TRIP** on all models of Power Presses at no extra cost! This patented non-repeating device uses two springs to hold release lever up. If one fails, the other takes over. If both fail, clutch automatically disengages. Springs replaced in 30 seconds without stopping machine.

Johnson

**MACHINE
and PRESS CORP.**

620 W. INDIANA AVE. • ELKHART, IND

IF YOU THINK SAFETY FIRST, think first of Johnson. Write for information on 8 models of open-back inclinable Power Presses now available. Ask about the new extra capacity, extra power No. 55 Press.

LOWN

SLIP ROLL FORMING MACHINES



Distributors in
Principal Cities

Model B-400
4" diameter

- Initial Type-Power Driven. • Rolls 4" diameter. • Oilite bearings - Alemite lubrication. • New type quick acting latch on drop arm. • Hand wheels on adjusting screws. • Roll position indicators. • Fast, sturdy and easy to operate. • Prompt Deliveries.

• Other size machines also available.

Write for Bulletins

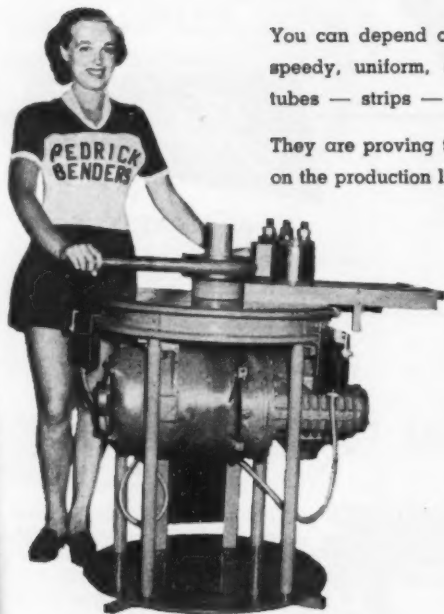
SAN ANGELO FOUNDRY & MACHINE CO.

San Angelo, Texas

. 1000 E. Upton

Speaking of Shapes!

PEDRICK PRODUCTION BENDERS TURN OUT THE BEST—



You can depend on Pedrick Production Benders for speedy, uniform, economical bending of pipes — tubes — strips — shapes and bars.

They are proving their efficiency and economy right on the production line every day. Rely on Pedrick for

speed, accuracy and versatility.

Equipped with relay controls, for semi-automatic duplicate bending—they handle pipe up to 6" extra heavy—have no clamps—require no special skills—eliminate the cost of expensive tools.

Write for Descriptive Folder.

PEDRICK TOOL AND MACHINE CO.

3638 N. LAWRENCE STREET

DEPT. 3

PHILADELPHIA 40, PENNA.

The 1951 National Metal Exposition and Congress

The 33rd National Metal Exposition and Congress, to which has been added the World Metallurgical Congress, will take place during the week of October 15-19, 1951, in Detroit. The attendance at the 1950 Metal Show approached a near high for this annual event; this year, however, the attendance gives every indication of establishing an all-time high.

An estimated 34,500 executives, engineers and production men, representing more than 8200 metalworking plants throughout the United States and Canada attended the 1950 Metal Show; this year, the tentative figure is placed at above 45,000 metalworking executives, not including, of course, the many thousands who will be attracted from the population of the Motor City.

As a business barometer, the past Metal Shows have reflected the moods of American business; in 1951 there is every indication of booming production on all fronts—indicating sustained high sales and consumer markets. The list of exhibitors, given on the following pages, includes some impressive names.

The National Metal Exposition and Congress is held under the joint sponsorship of the American Society for Metals; American Welding Society; Society for Non-Destructive Testing; and the American Institute of Mining and Metallurgical Engineers, Institute of Metals Division. The exhibits of hundreds of nationally recognized metalworking firms and manufacturers

of allied equipment will be shown. According to advance reports, past exhibitors have learned much from experience. The displays which have been prepared for the 1951 Metal Show are said to be smarter and snappier than in the past. Motion, color and excitement have been added to the displays.

This year, for the first time, under the sponsorship of the American Society for Metals, scientists from the free nations of the world will pool their resources. What concerns the metal industry of America rests in the knowledge, the techniques and the conservation experiences that will be brought forth at the World Metallurgical Congress. Approximately 1000 metallurgists from 21 foreign nations will be present. From these men, American metalworking men should learn much of production in times of critical shortages. Many of these men have worked and produced under severe handicaps; what they have accomplished should add considerably to our stock of knowledge. Discussions at these meetings will consider the conservation of metals and new techniques for processing alloy steels. Advances in non-ferrous substances will also be reviewed at these sessions.

The discussion leaders named for the World Metallurgical Congress include: Dr. Francis C. Frary, director of research for the Aluminum Co. of America; Dr. Erle G. Hill, director of metallurgy and development for the Wheel-

ing Steel Corp., Wheeling, W. Va.; Dr. Gilbert Doan, head of the Department of Metallurgy at Lehigh University, Bethlehem, Pa.; Dr. Harold K. Work, director of research and development for the Jones & Laughlin Steel Corp., Pittsburgh, Pa.; Dr. Carl E. Swartz, chief of metals research for the Armour Research Foundation of the Illinois

Institute of Technology, Chicago, Ill.; Dr. W. E. Thomas, vice president of the Magnaflux Corp., Chicago, Ill.; Dr. E. H. Stillwill, chief contact metallurgist, Dodge Plant, Detroit, Mich.; Dr. Gordon Johnson, supervisor of foundry research for the Armour Research Foundation of the Illinois Institute of Technology, Chicago, Ill.

33rd NATIONAL METAL CONGRESS AND EXPOSITION DETROIT, MICHIGAN, OCTOBER 15-19, 1951

LIST OF EXHIBITORS

Letter before booth number indicates building

A. & B. Centerless Grinding Co.	A115
A. B. C. Die Casting Machine Co.	G127
Acetogen Gas Co.	A215
Acme Manufacturing Co., Inc.	D103
Acme Steel Co.	C221
Acme Tool Co.	A205
Adamas Carbide Corp.	H218
Air-Flow Compressor Co.	H219
Ajax Electric Co., Inc.	F421
Ajax Electrothermic Corp.	F421
Ajax Engineering Corp.	F421
Ajusto Equipment Co.	H147
Aktiebolaget Kanthal	G352
Allegheny Ludlum Steel Corp.	G459
Allied Products Corp.	F302
Allison Co.	H431
Alloy Engineering & Casting Co., Inc.	B107
Alox Corp.	C112
Alvey-Ferguson Co.	H502
American Brakeblock Div.	F339
American Brake Shoe Co.	F339
American Chain & Cable Co., Inc.	A342
American Cyanamid Co.	G452
American Gas Assoc.	G160
American Gas Furnace Co.	G154
American Machine & Metals, Inc.	B246
American Machinist (publ.)	G256
American Manganese Steel Div.	F339
American Metal Market	C110
American Metals Co., Ltd.	G459
American Optical Co.	B128
American Platinum Works	G240
American Pullmax Co., Inc.	A249
American Silver Co., Inc.	D129
American Society for Metals (Detroit Chapter)	H420

American Society for Metals (National Office)	H323
American Society of Tool Engineers	H245
American Wheelabrator & Equip. Corp.	F439
Ames Precision Machine Works	A152
Amplex Manufacturing Co.	G416
Anchor Drawn Steel Co.	D345
Anderson Bros. Mfg. Co.	H351
Anderson Oil Co., F. E.	F255
Angler Corp.	G139
Applied Research Lab.	G121
Arco Corp.	F457
Aronson Machine Co.	C127
Ashdee Products, Inc.	G361
Ashworth Bros., Inc.	D140
Atlas Press Co.	A241
Aurora Metal Co.	C215
Austenal Laboratories, Inc.	B142
Automotive Industries	A256
Avon Tube Division	C237
Babcock & Wilcox Tube Co.	F314
Baird Associates, Inc.	H427
Bakelite Div. Union Carbide & Carbon Corp.	F322
Baker & Co., Inc.	A363
Baldwin-Lima-Hamilton Corp.	D311
Banner Manufacturing Co.	H302
Bausch & Lomb Optical Co.	B102
Bell & Gossett Co.	A308
Bernard Welding Equip. Co.	H220
Blakeslee & Co., G. S.	A250
Boice-Crane Co.	A141
Bowser, Inc.	H416
Brainard Steel Co.	G151
Brown-Hutchinson Iron Works	A149
Bruce Products Corp.	H223
Bruning Co., Inc., Charles	F426
Brush Development Co.	B147
Buck Tool Co.	C224
Buehler, Limited	B131



**ROTARY FILES
and TOOLS**

**THE COMPLETE LINE FOR
EVERY INDUSTRIAL PURPOSE**
over 5000 shapes, sizes and cuts

1/8" SHANKS



1/4" SHANKS

GROBET
Hand Cut, and
Ground from Solid
ROTARY FILES



1/8" SHANKS



1/4" SHANKS

1/2 SIZE

FULL SIZE



**GROBET INSIDE
TUBE-DEBURRING
FILES**



**GROBET
TUNGSTEN BURS**
Inexpensive,
but finest
at any price.

**SOLD THROUGH
LEADING
SUPPLY HOUSES**

Send for Catalog C



**HAND CUT
DISC FILES**
(1/4 Size)



**KEY CUTTING
FILES**



**GROBET
Combination
DEBURRING
FILES**



**GROBET
CHATTERLESS
COUNTERSINKS**

**GROBET
High Speed Rasps**




**GROBET
FIN FILES**

GROBET FILE COMPANY of AMERICA, INC.
421 CANAL STREET NEW YORK 13, N. Y.

Bundy Tubing Co.
Cadillac Stamp Co.
Cam-Lok Division
Empire Products, Inc.
Cambridge Wire Cloth Co.
Campbell Machine Div.
American Chain & Cable Co.
Carboloy Dept. —
General Electric Co.
Casting Engineers, Inc.
Chicago Metal Hose Corp.
Chicago Rivet & Machine Co.
Chicago Tramrail Corp.

D202
H258

H520
C111

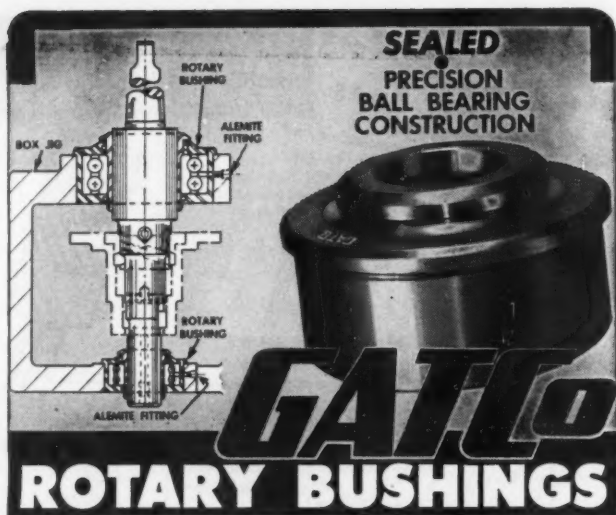
A342

F214
H324
C218
G214
H215

Chilton Co., Inc.
Chrysler Corp.
Cincinnati Milling Machine Co.
Cities Service Oil Co.
Clark Instrument Co.
Climax Molybdenum Co.
Clinton Machine Co.—Warner Div.
Coast Metals, Inc.
Coles Cranes, Inc.
Colonial Steel Division
Vanadium Alloys Steel Co.
Commander Manufacturing Co.

A256 & A138
G416
G356
D210
B143
D250
H546
H426
F307

D345
A159



**FOR DRILLING, CORE DRILLING,
ROUGH AND FINISHED BORING**

The inner race of the GATCO bushing rotates with the tool, piloting the tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

Write for full information and prices

GATCO ROTARY BUSHING CO.

1300 MT. ELLIOTT AVENUE

DETROIT 7, MICHIGAN

Telephone LO 7-3455

Commercial Shearing &
Stamping Co.

Commercial Steel Treating Corp.

Composite Die Supply Co.

Congress International des

Fabrications Mecaniques

Connors & Davis Sales Corp.

Continental Industrial Engineers, Inc.

Continuous Metalcast Corp.

Crane Packing Co.

Cro-plate Co., Inc.

Crucible Steel Co. of America

Dake Engine Co.

D321

D310

D112

H519

H423

H345

G459

D242

G122

G310

F416

Deepfreeze Distributing Corp.

Delaware Tool Steel Corp.

Delta Power Tool Div.

Detrex Corp.

Detroit Edison Co.

Detroit Electric Furnace Div.

Detroit Stamping Co.

Detroit Testing Machine Co.

Diamond Iron Works, Inc.

Die Casting (publ.)

Dieter Co., Harry W.

Distillation Products Industries Div.

Diversey Corp.

H254

C211

A319

G351

F481

A260

H306

B127

H236

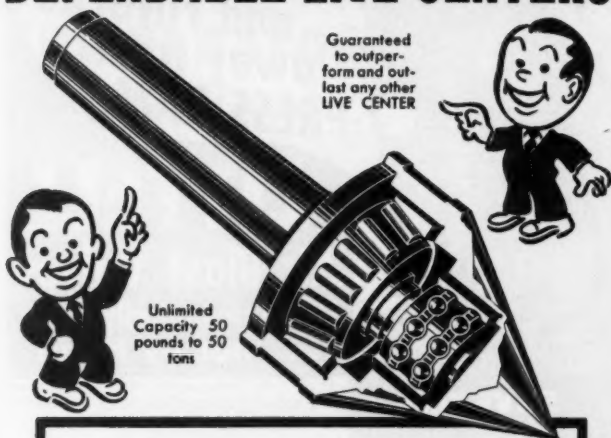
G440

B244

D236

G346

DEPENDABLE LIVE CENTERS



Heavy duty, long life, high speed are engineered and built into all MARVECO LIVE CENTERS.

MARVECO has earned the unquestioned stamp of approval from America's largest plants as being the most dependable live centers for every turning operation. Send blue prints for quotations.

Write for free catalog, "The Marvels of Marveco."

MARVEL TOOL & MACHINE CO.

ST. CLAIR, MICHIGAN

Diversified Metal Products Co.	H224	Electric Furnace Co.	F405
DoAll Co.	H305 & H406	Electric Products Co.	H202
Dow Chemical Co.	F222	Electro Arc Manufacturing Co.	H508
Dow Furnace Co.	A349	Elgin National Watch Co.	H235
Drever Co.	C229	Electro-Alloys Div.	
Driver Co., Wilbur B.	A305	American Brake Shoe Co.	F339
Dupont de Nemours & Co., E. I.	F358	Elox Corp.	G239
East Shore Machine Co.	H111	Empire Products, Inc.	H520
Eastman Kodak Co.	D236	Engelhard Industries	A363, A301, G240
Eaton Manufacturing Co.	H357	Engineer Castings Div.	
Eclipse Fuel Engineering Co.	G162	American Brake Shoe Co.	F339
Elastic Stop Nut Corp. of America	D223	Engis Equipment Co.	B223
Eldorado Mining and Refining Ltd.	H118	Ercona Corp.	B243



**keep HANDS
and FINGERS
away from
PRESS RAM**

LITTELL
Air Blast Valves
Eject Automatically by Air
... not by Hand

SAVE TIME Faster production and lower labor costs

SAVE AIR Reduce air consumption 92 percent

SAVE DIES No damage to dies due to clogging

SAVE HANDS Keep operators' hands and fingers out of danger zone

SAVE MONEY Insurance premiums are lower when accidents are reduced.

QUICKLY INSTALLED—Littell Air Blast Valves can be installed on any make or size press in only a few minutes.

F. J. Littell MACHINE CO.
AIR DIVISION

4147 RAVENSWOOD AVE., CHICAGO 13, ILL.

— District Offices, Detroit and Cleveland —



Erico Products, Inc.
Eutectic Welding Alloys Corp.
Fahrer Alloy Co.
Fawick Airflex Co., Inc.
Ferner, Co., R. Y.
Firth-Sterling Steel & Carbide Corp.
Fiske Brothers Refining Co.
Flow (publ.)
Industrial Publishing Co.
Foerster Institute
Freedom-Valvoline Oil Co.
Frontier Bronze Corp.

H158
F403
H151
G251
B218

G446
C232

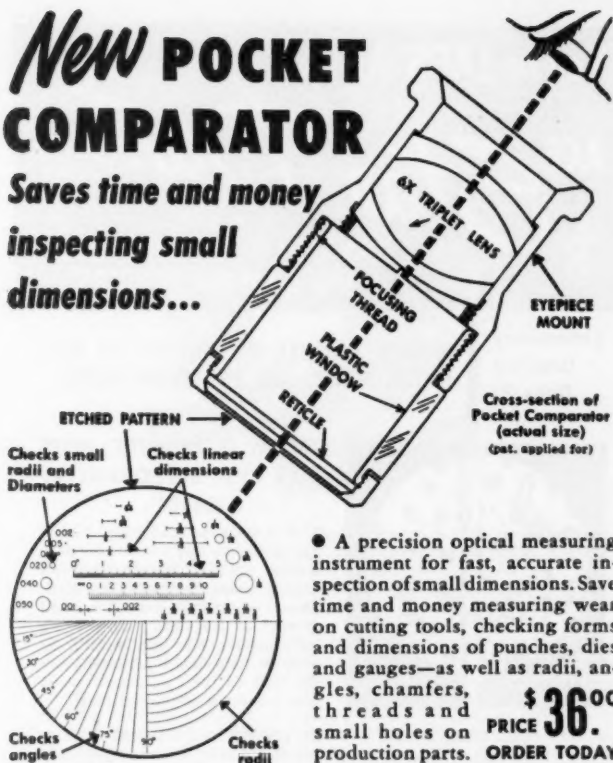
G440
B136
H244
B203

Galileo Corporation of America, Inc.
Gas Appliance Service, Inc.
Gehringer & Forsyth
General Alloys Co.
General Aniline & Film Corp.
General Controls Co.
General Electric Co.
General Electric X-Ray Corp.
General Plate Co.
Goodrich Co., B. F.
Gordon Co., Claud S.
Graham Manufacturing Corp.

B138
G158
D140
A338
G451
G164
A102
F250
D109
C212
H352
H257

New POCKET COMPARATOR

**Saves time and money
inspecting small
dimensions...**



\$36.00
PRICE

ORDER TODAY

a product of **BELL & HOWELL CO.** distributed by

Write for **FREE** descriptive folder

See Your National Tool Co. Representative or Local Jobber

NATIONAL TOOL CO.

11250 Madison Avenue Cleveland 2, Ohio

NATIONAL TOOLS CLEVELAND

Gray-Grimes Tool Co.

Gulf Oil Corp.

H. & H. Research Co.

H. & H. Tube & Mfg. Co.

Hammond Machinery Builders, Inc.

Hanchett Magna-lock Corp.

Handy & Harman

Harnischfeger Corp.

Harper Electric Furnace Corp.

Harshaw Chemical Co.

Haynes Stellite Co.

Heintz Manufacturing Co.

Heli-Coil Corp.

H154

D230

A205

D314

F211

H120

F315

G415

C204

A220

F440

A339

A154

Heppenstall Co.

Hevi Duty Electric Co.

Higbie Manufacturing Co.

Hilger, Ltd., Adam

Hitchiner Manufacturing Co.

Hobart Brothers Co.

Holcroft & Co.

Holden Co., A. F.

Hones, Inc., Charles A.

Hoskins Manufacturing Co.

Houghton & Co., E. F.

Howard Foundry Co.

Illinois Testing Laboratories, Inc.

C122

D350

C237

B146

H264

D138

G245

F406

G265

F217

F306

C138

B224

You're LAPS AHEAD with

ACE *Star Dust*

DIAMOND LAPPING CIRCULARS
AND DIAMOND POWDERS

*Laboratory
Grinding
Does It!*

MIRROR FINISHES IN MINUTES ON DIES,
TOOLS, Molds AND PRECISION PARTS



ACTUAL MICROPHOTO PROVE
STAR DUST SUPERIORITY AT
A GLANCE . . .

STAR DUST is so accurately crushed and graded by Ace's new laboratory method that it achieves uniform spherical shape, permitting all particles to work. Thus you are assured finishes of less than half a micro inch, quicker than ever before. By contrast, note lack of uniformity and the flats in the "ungraded" brand that prevent accurate finishing!

• STAR DUST USERS REPORT AVERAGE SAVINGS IN POLISHING TIME OF MORE THAN 75%. Available in ergonomic-tipped tubes or in new applicator gun that delivers minimum quantities to individual jobs and eliminates all waste . . . in all grit sizes as fine as .0001".

Write today for informative Bulletin No. A-11

ACE ABRASIVE
LABORATORIES

250 WEST 57th STREET
NEW YORK 19, N. Y.

Industrial Cable & Sling Co.	H251	International Nickel Co., Inc.	A328
Industrial Gas Div.		Invincible Vacuum Cleaner Mfg. Co.	H123
Liquid Carbonic Corp.	D114	Ipsen Industries, Inc.	F360
Industrial Heating (publ.)		Iron Age	A138
Industrial Publ. Co.	C239	Janney Cylinder Co.	G315
Industrial Heating Equipment Co.	D320	Jarrell-Ash Co.	B111
Industrial Press	H128	Jensen Specialties, Inc.	D215
Industrial Publishing Co.	G440	Johansson Gage Co., C. E.	B226
Industry & Welding		Johnson & Son, Inc., S. C.	G316
Industrial Publ. Co.	G440	Jones Co., C. Walker	A145
Institute Dr. Foerster	B136	K S M Products, Inc.	G321
International Mechanical Engineering Congress	H519	Kalamazoo Tank & Silo Co.	F416
		Kanthal Corp.	G352

PRECISION CIRCULAR CUTTERS

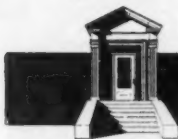


MEYCO carbide tipped and solid carbide cutters have earned an enviable reputation in plants where long tool life and precision workmanship is a **MUST**.

These cutters can be furnished in various diameters and thicknesses to meet the requirements of individual applications.

Saws and cutters, both carbide tipped and solid carbide, will aid production and precision in your slotting, venting, slitting and grooving operations . . . and they will be manufactured to your specifications. Please furnish complete specs and quantities desired when requesting prices and indicate material to be cut. MEYCO experience in the manufacture of precision tools, since 1888, is at your disposal.

Write for catalog No. 15 for further details and a price list.



W. F. MEYERS CO., INC., BEDFORD, INDIANA

Kearney & Trecker Corp.

Kelite Products, Inc.

Kemp Manufacturing Co., C. M.

Kennametal, Inc.

Kentucky Agricultural & Industrial
Development Board

Kerns Co., L. R.

Keuffel & Esser Co.

King, Andrew

Kold-Hold Manufacturing Co.

Kolene Corp.

Kropp Forge Co.

Kuhlman Electric Co.

A240

H253

G144

G252

H155

A119

H206

B122

G345

A315

D222

A260

Kux Machine Co.

Laboratory Equipment Corp.

Lake Shore Engineering Co.

Lapeer Mfg. Co.

Last Word Sales Co.

Leeds & Northrup Co.

Leitz, Inc., E.

Lepel High Frequency Laboratories,
Inc.

Lincoln Electric Co.

Lindberg Engineering Co.

Liquid Carbonic Corp.

Livingstone Engineering Co.

A122

B247

B134

H157

H154

F351

B211

G145

F348

F340

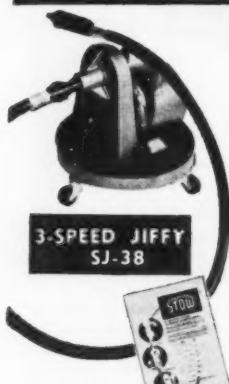
D114

D228

step up production with



STOW
flexible shaft
MACHINES



These dependable STOW FLEXIBLE SHAFT MACHINES save production time . . . speed up output . . . help lower production costs. Variable Speed Models shown are easily portable . . . cut down operator fatigue and increase on the job efficiency!

Constant Speed Models available. Also complete line of accessories designed to increase the utility of STOW Flexible Shaft Machines!

WRITE TODAY

for your free copy of CATALOG 51

STOW

Manufacturing Co., Inc.,
30 Shear St., Binghamton, N. Y.

Loftus Engineering Corp.
Los Angeles Chamber of Commerce
Los Angeles Dept. of Water & Power
Lubriplate Division
Fiske Bros. Refining Co.
Lynchburg Foundry Co.
Machinery (Publ.)
Industrial Press
Magnaflex Corp.
Magnethermic Corp.
Magnetic Analysis Corp.
Mahr Manufacturing Co., Div.
Makepeace Co., D. E.

G339 &

G125
G215
G215

C232
D337

H128
G230
234
B231
H236
A301

Manufacturers Processing Co.
Martindale Electric Co.
Marvin Machine Products, Inc.
May Fran Engineering
Master Builders Co.
McGraw-Hill Publishing Co., Inc.
Mechanical Air Controls, Inc.
Mechanics Laundry Co.
Merrill Brothers
Metal Products Sales Co.
Metal Progress
ASM National Office
Metal Removal Co.

H110
C201
F416
H541
C131
G256
H340
D303
C134
H264

H323
H126

**REMOVES FUMES—DUST
FASTER!**



High Quality
**PRESSURE
BLOWER**

only

\$49⁵⁰

**REG. PRICE
\$70.00**

For the fast, efficient elimination of welding fumes, sawdust, or other air impurities, you can depend on this precision-made, all-aluminum high-pressure blower. Made with 5½" inlet and 3½" outlet. Enclosed ½ H.P. Westinghouse single phase motor, 115 V., A. C., provides 3450 R.P.M. and up to 450 C.F.M. Immediate delivery! Ask for #BLSOW.

STANDARD ELECTRIC

**MFG. CO., INC.
WEST BERLIN, N. J.**

Metals & Controls Corp.
Metals Finishing Corp.
Metals Review
ASM National Office
Michiana Products Corp.
Michigan Bell Telephone Co.
Michigan Industrial Gas Corp.
Michigan Steel Casting Co.
Microcast Division
Austenel Laboratories, Inc.
Miller & Taylor Tool Co.
Milne & Co., A.
Mir-O-Col Alloy Co., Inc.

D109
H526

H323
A312
F401
H210
G409

B142
G456
A356
A316

Modernair Corp.
Morton Gregory Corp.
Mueller Brass Co.,
Multifinish Manufacturing Co.
National Carbon Co.
National Cored Forgings Co., Inc.
National Cylinder Gas Co.
National Diamond Laboratory
National Industrial Publishing Co.
National Lead Co.
National Radiator Co.
National Research Corp.

H315
G202
H241
H247
F440
F254
G112
C210
C239
F449
H109
A309

New Low Cost Method

**Copies Anything
in 1 minute!**

*Makes photo-exact
copies of letters,
contracts, blueprints,
bids, specifications,
government forms*

\$67⁵⁰
machine only
APÉCO
PHOTOEXACT
Copier



Completely eliminate costly re-typing, hand copying, drafting, rechecking or sending out for expensive photo-copies. Make legally-accepted exact copies up to 18" x 22"—right in your own office, direct from originals—at one-per-minute rate. Just plug in—anyone can run it. Used and approved by thousands of leading industrial concerns, professional men, schools and government agencies.

See what you can save!
80% on photo prints
68% on re-typing

Send for FREE BOOK

Mail Coupon
TODAY!

AMERICAN PHOTOCOPY EQUIPMENT CO.
2845 N. Clark St., Chicago, Illinois

Please rush me FREE BOOK on Photocopying and full details on Apeco Photo-Exact Copier.

Name _____
Firm _____
Address _____
City _____ Zone _____ State _____



Offices: Chicago,
New York, Los Angeles
—all principal cities

National Spectrographic

Laboratories
National Time & Signal Corp.
National Torch Tip Co.
Nelson Stud Welding Div.
New Hermes Engraving Machine Corp.
New Jersey Zinc Co.
Niagara Blower Co.
North American Phillips Co., Inc.
Nox-Rust Chemical Corp.

B146
B238
H148
G202

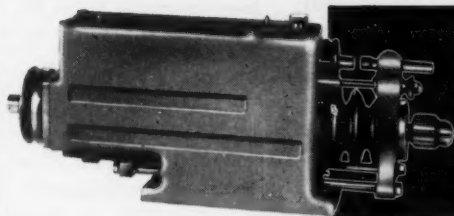
H109
A162
G422
A220
H417

O. T. U. A.

Office Technique Pour L'Utilisation
de L'Acier

Oakite Products, Inc.	H521
Ohio Crankshaft Co.	D309
Ohio Overall Cleaning Co.	G246
Olsen Testing Machine Co., Tinius	D303
Opplem Co., Inc.	D216
Osborn Manufacturing Co.	B138
Oxalind Division	D118
Pangborn Corp.	G451
	G421

NEW Compact Drilling Units



4000 Series

Heavy Duty,
self powered.
Drill to $\frac{5}{16}$ "
dia. in alloy
steel. Heavy
thrust pres-
sure.



4000 SA Series

Light Duty,
Shop Air. Drill
 $\frac{1}{8}$ " dia. in
mild steel.

For Production Small Hole Work

● Both LOCKE units are capable of deep hole, dwell and jump gap drilling. $\frac{3}{4}$ " overall width permits close assembly for multiple operations. Let us demonstrate or send for full information.

LOCKE GAGE CO.

10232 Woodward Ave.
Detroit 2, Michigan

Park Chemical Co.
Parker Rust Proof Co.
Peabody Industries
Penton Publishing Co.
Peters-Dalton Co.
Phillips Manufacturing Co.
Physicists Research Co.
Picker-X-Ray Corp.
Platcoll Div.
Kold-Hold Mfg. Co.
Powdered Metal Products Corp. of
America

F456
H339
H214
G340
G355
A355
D135
F411

345
A118

Power Ball Oil Co.
Precision Metalsmiths, Inc.
Precision Spring Corp.
Precision Welder & Machine Co.
Product Engineering (Publ.)
McGraw Hill Publishing Co.
Product Engineering & Mfg. Corp.
Production Machine Co.
Pyrometer Instrument Co., Inc.
RCA Victor Div.
RCS Tool Sales Corp.
Radio Corporation of America

A105
B123
A214
H364

G256
H221
F225
B108
D324
H316
D324

Ransburg Electro-Coating Corp.
 Rapids-Standard Co., Inc.
 Raytheon Manufacturing Co.
 Ready Power Co.
 Reeves Pulley Co.
 Reliance Electric & Eng. Co.
 Rem-Cru Titanium Co., Inc.
 Reynolds Metals Co.

G445
 H121
 A255
 G131
 A350
 A360
 G310
 F325

Richard Brothers Div.
 Allied Products Co.
 Richards Co., J. A.
 Riehle Testing Machines Div.
 Robotron Corp.
 Rockwell Manufacturing Co.
 Rolock, Inc.
 Ross Operating Valve Co.

F302
 H152
 B246
 H535
 A319
 D140
 B232

SOMETHING FOR EVERYBODY

by Professor Herman Reichardt, Consulting Engineer

If you get at least two answers right, give yourself 100%; below 20 . . . a big zero.

1. The base of a triangle is the **longest**, the **shortest** or **any side**.
2. An acute angle triangle is one where all angles are **more** or **less** than 90 degrees.
3. Tobin bronze contains from **30 to 50** or **50 to 65** per cent copper?
4. Tobin bronze gives off **heavy** or **no** sparks?
5. The carbon content of oil tempered spring wire is about **40 to 50** or **60 to 70** per cent?
6. Chromium-vanadium spring steel is used when heat is **low** or **high** for carbon steel?
7. Bearings should not exceed **160** or **180** degrees of heat?
8. Pouring babbit metal too hot results in **blow holes** or **shrinkage**?
9. Splash lubrication provides oil dripping **from above** or **in reservoir beneath**?
10. Copper spring wire contains about **85** or **65** per cent copper.

Answers to quiz on page 243

People work better when they SEE BETTER



In the Bell Telephone Laboratories:
 Precision machinist working on a mill-
 ing machine finds Magni-Focuser an
 invaluable seeing aid.

MAGNI-FOCUSER's
 matched prismatic lenses give needle-sharp
 magnification. Comfortably light weight. Fits
 over regular glasses. Leaves both hands free.
 Normal vision may be resumed by lifting head.

MAGNI-FOCUSER

SPEEDS PRODUCTION

Leaves both hands free to work

Precision workers do the job faster and more accurately with a Magni-Focuser—the proven binocular magnifier.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Now aiding thousands of workers, the Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

EDROY PRODUCTS CO.

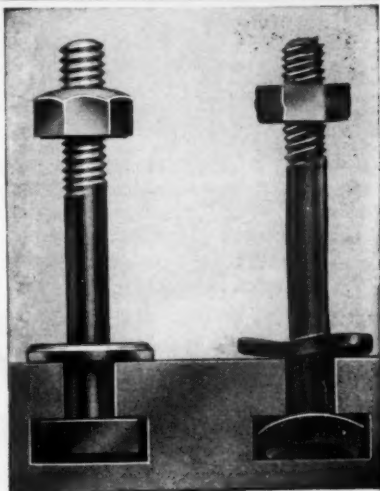
480 Lexington Ave.
 Dept. 14, New York 17, N. Y.



BOYAR-SCHULTZ SMB SPECIAL MACHINE BOLTS

Every mechanic knows the damage done to the accuracy of costly machine tools by using soft, poorly made or distorted bolts on T-Slots of machine beds.

Boyar-Schultz SMB Bolts are made from upset forgings of alloy steel, heat treated for maximum properties. They are precision machined with heads at right angle to body, presenting a flat bearing surface to T-Slots. For best results use SMB Nuts and Washers with SMB Bolts.



SMB Bolt on left fits the T-Slot. Poorly made bolts of soft materials break down the machined surfaces, destroying accuracy.

BOYAR-SCHULTZ CORPORATION, 2108 Walnut Street, Chicago 12, Illinois

BEWARE OF
IMITATIONS



Our machine carries the Butterfly trade mark.

Registered
U. S. Patent
Office

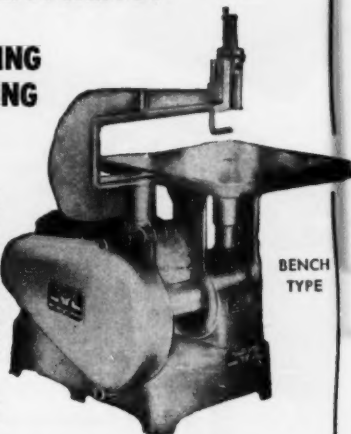
TO INCREASE PRODUCTION TO IMPROVE EFFICIENCY

USE
**BUTTERFLY FILING
AND DIE MAKING
MACHINE**

MOUNTED
ON
PEDESTAL

This is a powerful machine, for heavy or small precision work in use all over the world: Airplane Factories, Ammunition Plants, Toolrooms where fast production is desired. 4 Models, No. 16, No. 14, "EL" and Model "D". The larger the model, the larger the stroke and therefore more filing is performed, furnished with or without pedestals.

Constructed as per Specification of U. S. Naval Aircraft Factories.

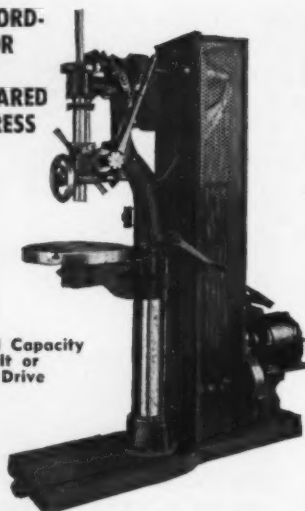


BENCH
TYPE

HARVEY MFG. CORP.

Dept. H, 161 Grand St., New York Phone: CAnal 6-5170

**ROYERSFORD-
EXCELSIOR
21-INCH
BACK-GEARED
DRILL PRESS**



**1½" Drill Capacity
V-Belt or
Gear Drive**



**ARBOR PRESS
Sizes 0 to 3½**

*Write today for
free descriptive
literature.*



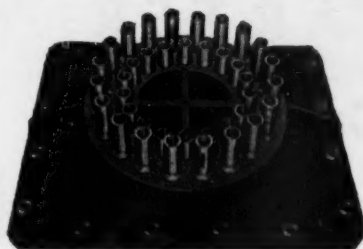
**M2A
HACK SAW
6"x6" Capacity**

**ROYERSFORD FOUNDRY
& MACHINE CO., Inc.
BOX B ROYERFORD, PA.**

Ross, Irving	G459
Scovill Mfg. Co.	G330
Sand Machinery Co.	G462
Safety Clothing & Equipment Co.	A219
Sales Service Machine Tool Co.	B218
Schenck, Carl (Darmstadt, Ger.)	G309
Schrader's Son Division A.	G318
Sciaky Bros., Inc.	H243
Scott & Son., Inc., C. U.	G459
Scovill Manufacturing Co.	A320
Seal-Peel, Inc.	G148
Selas Corp. of America	A109
Sentry Co.	G117
Service Diamond Tool Co.	A155
Sheldon Machine Co., Inc.	D129
Sherman & Co.,	H358
Sinclair Refining Co.	H524
Smith Corp., A. D.	A208
Smith Welding Equip. Corp.	G221
Socony-Vacuum Oil Co., Inc.	A202
Solventol Chemical Products, Inc.	H146
Sonoflux Corp.	A218
Sparkler Mfg. Co.	H424
Special Libraries Assoc.	B128
Metals Section	G260
Spencer Scientific Instruments	D109 & D115
Spencer Turbine Co.	D115
Sperry Corp.	D140
Sperry Products, Inc.	D110
Standard Alloy Co.	H328
Standard American Eng. Co.	G210
Standard Diemakers Supplies	D130
Standard Electrical Tool Co.	H139
Standard Oil Co. (Indiana)	A216
Standard Steel Treating Co.	C123
Standard Tube Co.	G340
Starrett Co., L. S.	G220
Steel (Publ.)	D330
Penton Publishing Co.	A158
Steel City Testing Machines, Inc.	A359
Stevens, Inc., Frederick B.	A266
Stokes Machine Co., F. J.	H254
Stone Machinery Co., Inc.	F256
Stuart Oil Co., Ltd., D. A.	F240
Sub Zero Products Mfg. Div.	H135
Deepfreeze Distributing Corp.	B227
Sunbeam Corp.	C117
Surface Combustion Corp.	H530
Syntron Co.	C103
Tagliabue Instruments Div.	B236
Weston Elec. Instrument Corp.	C228
Templ Corp.	C207
Tennant Co., G. H.	
Texas Co.	
Tin Research Institute, Inc.	
Tincher Products Co.	
Tinnerman Products, Inc.	

Tocco Induction Heating Equip. Div.	
Ohio Crankshaft Co.	G246
Tool Engineer (Publ.)	
Amer. Society of Tool Engineers	H245
Tracerlab, Inc.	B118
Trent Tube Co.	G310
Trerice Co., H. O.	B245
Tri-Clover Machine Co.	H346
Uddeholm Co. of America	B116
Udylite Corp.	D330
Union Carbide & Carbon Corp.	F440
United Chromium, Inc.	B132
U. S. Air Forces—Materials Research	H136
U. S. Electrical Motors, Inc.	D302
U. S. Gypsum Co.	H143
Universal Castings Corp.	G115
Universal-Cyclops Steel Corp.	F247
Univerlital Machine Co.	H348
Upton Electric Furnace Co.	C102
Vanadium-Alloys Steel Co.	D345
Vapofier Corp.	C109
Vickers, Inc.	G109
Victor-Peninsular Div.	
Allied Products Co.	F302
Vlier Mfg. Co.	B204
Walder-Scott, Inc.	G101
Walker-Turner, Div.	A240
Wall Colmonoy Corp.	C243
Warner Division	
Clinton Machine Co.	H546
Webber Appliance Co., Inc.	H248
Weidit, Inc.	H545
Wells Manufacturing Corp.	D209
Wells & Sons, W. F.	H117
Weltronic Co.	G224
Western Sealant of Detroit, Inc.	C118
Westinghouse Electric Corp.	G430
Weston Electrical Instrument Co.	B227
Wheelco Instruments Co.	D219
Wilson Carbon Co.	B220
Wilson Mechanical Instrument Div.	
American Chain & Cable Co.	A342
World Raw Materials Congress	H519
Worthington Pump & Machinery Co.	G455
Wynn Oil Co.	H124
Zeiss, Inc., Carl	
Ercona Corp.	B243

Appointment of Austin L. Hawk as assistant manager of the Western Sales District, Manhattan Rubber Division of Raybestos-Manhattan, Inc., has been announced by the company's executive offices at Passaic, N. J. Mr. Hawk is located at the Western Sales District Offices at 445 Lake Shore Drive, Chicago.



Pictured: a 38-Spindle Heavy-Duty Drill Head

**DESIGNERS AND
MANUFACTURERS OF
MULTIPLE DRILLING EQUIPMENT**

We invite your inquiry.

MICHIGAN DRILL HEAD CO.

971 E. 8 Mile Road Hazel Park, Mich.

CLIPPER

PRECISION DIAMOND TOOLS

Industrial Diamonds

Thread Grinders

Turning Tools

Engraving Tools

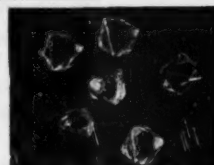
Dressing Tools

Diamond Powder



**J & L
Thread
Grinder
Dressing Tool**

Every CLIPPER tool is guaranteed. Send blue-prints. Let us quote on your requirements:



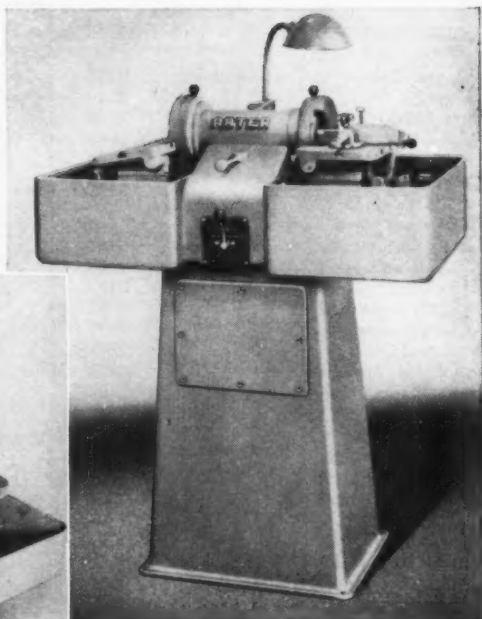
**Prompt Delivery on Diamond Wheels
Representatives in Principal Cities**

CLIPPER DIAMOND TOOL CO., INC.

210 W. 45 ST. N.Y. 12



ARTER IMPERIA Carbide Tool Grinder Model 200



Off-hand grinding of tools is seldom a satisfactory operation. Hands are unsteady, tool shanks can be rough or not flat, work tables may not be smooth. The result—poor tool grinding, shorter life between grinds, possible expensive diamond wheel damage.

ARTER IMPERIA CARBIDE TOOL GRINDER work tables are *movable*. Tables are held on two pivot-edged side plates by vertical tension springs, forming a flexing mounting. Very light hand pressure moves table and tool forward and back across the face of the diamond wheel. In-feed is made by a knurled knob bearing a graduated disc. The work tables can be tilted to

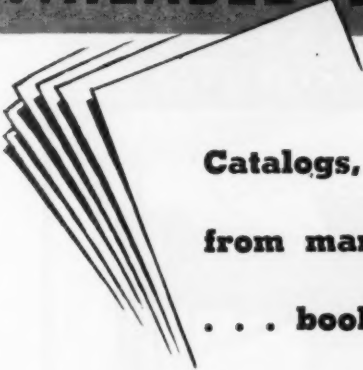
the required degree of angularity. Two protractor type graduated tool holders are standard equipment. When grinding chip breakers the wheelhead also can be moved up and down, a compression spring giving smooth easy action. This compact double-table machine can be set up for roughing and finishing tools, finishing and polishing, or finishing and grinding chip breakers.

ARTER GRINDING MACHINE CO.

WORCESTER 5, MASS. . . . U.S.A.

AVAILABLE LITERATURE

NOVEMBER, 1951



Catalogs, bulletins available from manufacturers ... books, films

1. **The Split-Sleeve Collet-Type Driver** used to drive straight-shank twist drills is particularly suitable because multiple-spindle drill heads can be designed with spindles on a very close center-to-center distance and bushing plates do not have to be moved when drills must be replaced. American Standard covers specifications of drill drivers from 0.0390 to 0.6875 inches. American Standards Assn., 70 E. 45th St., New York 17, N. Y.

2. **The Cincinnati Filmatic 10" and 14"-L Plain Hydraulic Grinding Machines** are center-type grinders capable of rapidly producing fine finishes and close tolerances of accuracy; grinding wheel spindle rotates on Filmatic bearings which are self-adjusting. 11-page publication No. G-603 includes illustrations and specifications. Cincinnati Grinders Inc., Cincinnati 9, O.

3. **The Woerner Tubular Profile Cutter** provides a simple, fast method of cutting irregular intersections and shapes of pipe and tubing. The cut edge is perfectly finished ready for welding or other fabrication. Heath Engrg. Co., Fort Collins, Colo.

4. **The Ettco-Emrick No. 72A Tapping Machine** is a specially designed, sensitive tapping machine that can be op-

erated by using either foot or air pressure; interchangeable single spindle tapping units and multiple heads allow quick changeover. Folder may be obtained from the Ettco Tool Co., Inc., 594 Johnson Ave., Brooklyn 6, N. Y.

5. **The Optical Follower**, a duplicating instrument for doing precision hole spacing work, is specifically designed for attachment to the Bridgeport and other kneetype milling machines. Folder from the Boeckeler Instrument Co., 31 E. Rillito St., Tucson, Ariz.

6. **The New Series "F" Lead Screw Fittings Machines** were developed for the pipe and conduit fittings industries. Folder illustrates such features as the vertical spindles, holding jaws and fixture, left hand head, double tee head, electrical panel, tap holder assembly, feeding mechanism. Cleveland Tapping Machine Co., Canton 6, O.

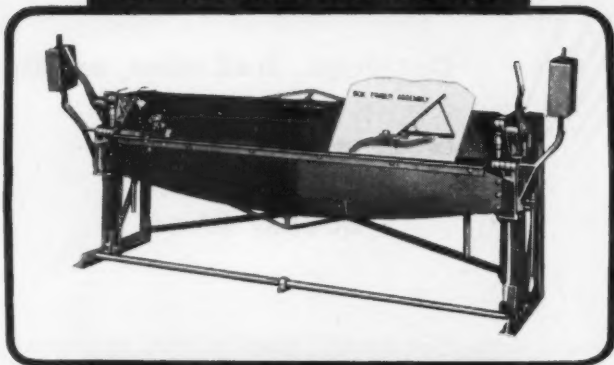
7. **Baker Industrial and Laboratory Furnaces** give quick, uniform heat, no blowers required, need only one gas connection for installation. 4-page pamphlet discusses small tool room, laboratory type, and larger tool-room, burn-out and industrial variety. Baker & Co., Inc., 850 Passaic Ave., E. Newark, N. J.

8. **The Toolmaker Line Catalog** lists

WHITNEY METAL

TOOL COMPANY

41 YEARS EXPERIENCE



WHITNEY-JENSEN

ROLLER BEARING

BENDING BRAKES

A modern departure from conventional hand brake design. Work is not limited to straight bending and box and pan work alone. Special attachments permit many intricate forming operations. Made in 16, 14, 12 gauge capacities; 4, 5, 6, 8, and 10-foot sizes.

WHITNEY METAL TOOL COMPANY

115 FORBES STREET, ROCKFORD, ILLINOIS

vices, drill press clamps, taper attachments, drilling tables, converters, microscopes, hack saws, profile grinders, etc. All machines illustrated, 16 pages. Montgomery & Co., Inc., 53 Park Place, New York 7, N. Y.

9. Simonds "Red Streak" Flat Ground Die Steel is now available in 36" length bars in 35 standard stock sizes from $\frac{1}{2}$ " x 2" up to $1\frac{1}{2}$ " x 10". Made of oil hardening, non-deforming type die steel, this multiple purpose die steel is uni-

formly annealed and accurately ground to a thickness limit of plus or minus .001". Wall Chart available from Simonds Saw & Steel Co., Dept. A, 470 Main St., Fitchburg, Mass.

10. Tomco Hand Wheels and Knobs, Machine and Ball Handles, and specialties, feature machined and blank castings, highest quality fine grained cast iron, all hand knobs treated to prevent rust, etc. Folder from Tomco Products Co., 1633 Douglas Ave., Racine, Wisc.

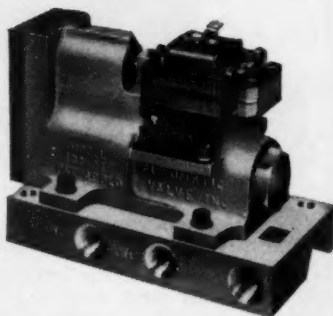
**7,632,113
OPERATIONS**

**Actual performance
of a standard 3/8",
4 - Way AUTOMATIC
solenoid valve
before maintenance
was required.**

**RUGGED
CONSTRUCTION
FOR HEAVY DUTY
OPERATION**

**•
CYCLING TO
600 PER MIN.
•**

**FOR CONTROL OF
COMPRESSED AIR-
PRESSURES
20 TO 150 LBS.**



Available in standard pipe sizes.

Thousands of AUTOMATIC 3-way and 4-way valves in daily operation. Write for bulletin and prices. Attractive quantity and O.E.M. discounts.

**PIONEERS and SPECIALISTS in PILOT
OPERATED SOLENOID CONTROLLED VALVES**



AUTOMATIC VALVE CO.

37429 GRAND RIVER AVE., FARMINGTON, MICH.

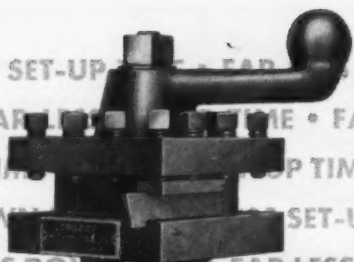
11. Auto-Feed Attachment will handle all types of infeed work, including shoulder and taper grinding, will grind bearing diameters on connecting rod bolts to a .0005 limit at a production rate of over 2,000 pieces per hour. **Bennett Equipment Co., 4725 Ellery St., Detroit 7, Mich.**

12. Ball Bearing Bench Grinders, Arbors, Sanding Discs and Face Plates are illustrated and described in a 8-page catalog which includes specifications, dimensional diagrams and application

suggestions for using the saw and adapter arbors to build special production tools. **Poly Products, 2032 E. Walnut St., Pasadena 8, Calif.**

13. The New, Modernized Niles 42" Vertical Boring and Turning Mill with side head is described in a 4-page illustrated bulletin covering several design features recently incorporated in the machine, other features and specifications. **Baldwin-Lima-Hamilton Corp., Hamilton, O.**

FAR LESS SET-UP • FAR LESS DOWN
 TIME • FAR LESS SET-UP TIME • FAR LESS
 DOWN TIME • FAR LESS SET-UP TIME • FAR
 LESS DOWN TIME • FAR LESS SET-UP TIME
 • FAR LESS DOWN TIME • FAR LESS
 SET-UP TIME • FAR LESS SET-UP
 FAR LESS SET-UP



America's first and finest

CROZIER TOOL POST TURRET

now with 12 position indexing

12 position indexing now makes possible the alignment with work at any thirty degree increment. This is only one of the outstanding features developed by the first and largest manufacturer of turrets for small lathes. Other features include built-in cut-off tool and holder and positive rapid indexing. All wearing parts are hardened and precision fit. They are available in three sizes.

Switch to Crozier Tool Post Turrets today. Save as much as 75% set-up and down time. Model 31, for Logan, Atlas, Craftsman, South Bend, etc. \$30.80. Write for catalog.

CROZIER MACHINE TOOL CO.

Dept. MTB-11

Hawthorne, California

14. The Cincinnati 8" x 18" Tool and Die Milling Machine was designed especially for jobs requiring the accurate duplication of shaped contours or the reproduction of intricate detail. 20-page illustrated publication No. M-1731 describes the machine. Cincinnati Milling Machine Co., Cincinnati 9, O.

15. Precision Feeds to fit any press are listed in folder containing illustrations and prices. Feeds can't slip—each wedge has four points of contact to safeguard

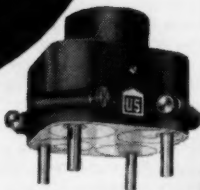
accuracy; reverses instantly—merely shift feed finger spring from one lug to the other. Roll Feeds Corp., Pawtucket, R. I.

16. The Imperia Grinder offers something new in a method of grinding carbide tools. The work table with the tool is moved across the face of the grinding wheel; tool feed is accurately controlled by screw feed to the work table. In the same machine the chip breaker grind can be made by moving the wheel on

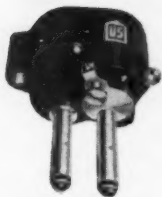
Hard to Please?

If you're looking for really fine quality heads, available at the lowest possible price, remember that our drill heads have been designed to answer fully today's drilling needs—and tomorrow's as well.

We manufacture all types of multiple-spindle, fixed-center, adjustable and individual lead screw tapping heads.



Single eccentric type for equally spaced holes on bolt circles.



Two spindle head unit—one spindle fixed, the other spindle adjustable for the fixed positions.



Universal joint with slip spindle fixed locating plate.



SINCE 1915

UNITED STATES DRILL HEAD CO.

CINCINNATI 4, OHIO

and down. Folder available from Arter Grinding Machine Co., Worcester 5, Mass.

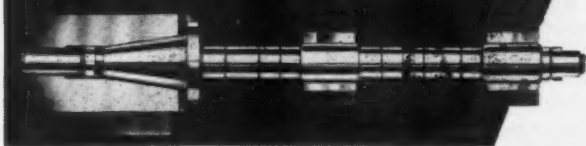
17. Industrial Diamond Tools—wheel-dressers, radius forming tools, thread grinders, handdressers, valve grinders, gear grinders, hardness testers, contact point, shape tools, tungsten carbide matrix, scribing tools, glass cutters, etc., are listed and illustrated in folder. Hay-fred Co., 91 Broadway, Springfield, Mass.

18. Carbide Precision Gage Blocks are solid carbide and their use will reduce the maintenance cost and eliminate the frequent replacement of steel gage blocks. 8-page catalog lists various sets and attachments. Pratt & Whitney, West Hartford 1, Conn.

19. Angl-Gear Units are standardized right angle bevel gear drives which are suitable for use in either manual or power operated systems beyond the limitations of ordinary commercial

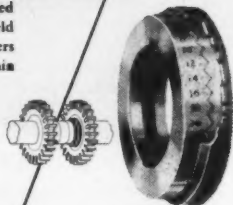
FOR FAST, ACCURATE, LOW-COST
MILLING MACHINE OPERATIONS

use **S-J** ARBORS and ADAPTERS



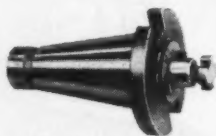
Make heavy or light cuts, fast and accurate, with S-J rugged precision built Arbors. Arbor and pilot diameters held to plus .0000", minus .0005". Arbors filled with spacers and sleeves which have faces ground parallel within .0002"—makes cutters run true and take an even distribution of cutting load.

Low-cost milling machine operations are assured when using S-J Arbors. Built from forgings, they are tough and withstand the punishment required of today's production.



TIME-SAVING
S-J ADJUSTABLE
SPACING COLLARS

HIGH PRECISION
S-J SOLID SPACING COLLARS



LARGE SELECTION S-J ADAPTERS

Write for New Bulletin No. 2-50
showing complete line of
S-J Arbors, Collars and Adapters.

Scully-Jones

1907 S. ROCKWELL ST., CHICAGO 8, ILLINOIS

8075 M7216

YOU GET LOW COST, FAST, ACCURATE PRODUCTION WITH OUR STANDARD AND SPECIAL TOOLS

products. Airborne Accessories Corp., 25 Montgomery St., Hillside, N. J.

20. "Principles of Centerless Grinding," a 48-page illustrated booklet, includes sections headed as follows: Basic Principles, Methods and Advantages, Operating Controls and Construction Details, Work Blades, Wheels, Truing the Wheels, Corrective Adjustments, How to Economically Grind Small Lots on a Centerless, Examples of Centerless Grinding; plus tables for estimating

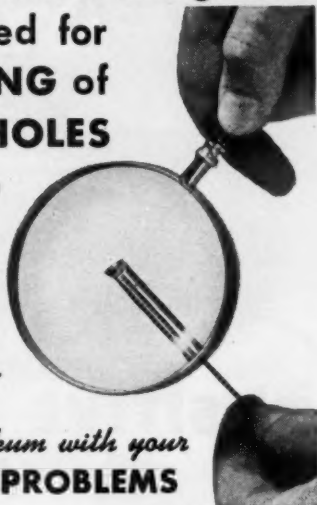
production. Cincinnati Grinders Inc., Cincinnati, O.

21. 6-Spindle Conomatic Bar Machines are illustrated and described in a 14-page catalog. 2-page cross section picture illustrates 44 features. Cone Automatic Machine Co., Inc., Windsor, Vt.

22. Bed Turrets, Tool Post Turrets, Cut-Off Cross Slides, Solid Socket Tool Holders, Back and Front Tool Posts are among the equipment listed in 4-page illustrated folder which may be ob-

THIS Solid Carbide Boring Tool is what you need for precision BORING of DEEP, SMALL HOLES

This Bokum tool provides a practical way to bore to greater depths in ratio to diameter. Finish bore often in one pass. More rigidity permits higher speeds without chatter. Send for Catalog H 948.



Come to Bokum with your
BORING PROBLEMS

Bokum high-speed steel tools for general boring and threading are distinguished by their helical backed off form, which produces a smooth, clean, precision bore. Ask for Cat. H 1139-6.

Carbide-tipped boring and internal threading tools. Cat. H 398

All Bokum tools available in sets in assortments of your own choice. Cat. H Supl. No. H 1139-6

Tool Holders for holding Bokum Boring Tools in lathes and turret lathes. Cat. H 483

Resharpener fixtures to prolong the long life of Bokum Boring Tools.

For small tools Nos. 00000 to 3. Cat. H-AB-1 For large tools Nos. 4 to 12. Cat. H-AB-4-12



tained from the Lynn Mfg. Co., 2913
Lyndale Ave. S., Minneapolis, Minn.

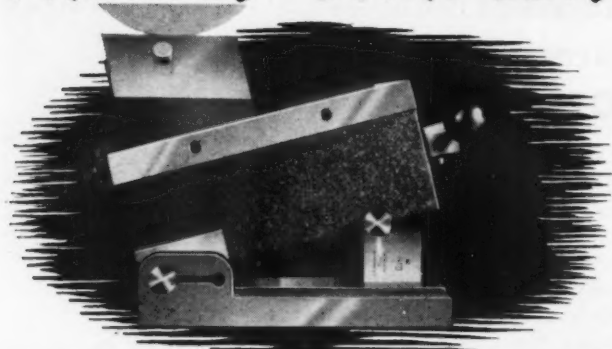
23. The Parker-Kalon Assembly Handbook, 24 pages, contains the essentials of P-K self-tapping screw selection, application information, recommended hole sizes and corresponding drill size numbers. All of its information is up-to-date and many of its tables conform to the latest recommendations of the American Standards Association. When writing, ask for Form No. 480, Parker-

Kalon Corp., 200 Varick St., New York 14, N. Y.

24. Tapping Data Book includes fits, tolerances, and other engineering information pertinent to the production of threaded parts, 24 pages, available from the Standard Tool Co., Department V., Cleveland, O.

25. Steel Stamp Folder illustrates steel letters and figures, steel hand stamps, inspectors hammers, supreme holders, type and roller dies. Featured is the

FASTER-SIMPLER



POSITIVE ANGULAR ACCURACY



SEND FOR
CATALOG



OMER E. *Robbins* COMPANY

Manufacturers of the MAGNA-SINE and Other Precision Tools

5722 TWELFTH ST. • DETROIT 8, MICH.

For any angular set-up, whether single or compound, simply insert standard gauge blocks between the Magna-Sine plates. Proper gauge blocks are indicated in the Robbins Table of Constants. Positive accuracy in a few moments. Work is securely held by magnetic attraction. In two models and sizes; also non-magnetic models for inspection set-ups.

Pannier Supreme Holder with the hardened steel anvil and interchangeable head. The Pannier Corp., 207-209 Sandusky St., Pittsburgh 12, Pa.

26. Onsrud W-244 and W-304 Heavy Duty Routers handle a wide range of routing, shaping and milling work in wood, aluminum and related metals and materials. Entire spindle assembly and housing of an Onsrud high speed heavy duty router may be easily removed for repairs and replaced by another unit to

eliminate costly down-time. Onsrud Machine Works, Inc., 3908 Palmer St., Chicago 47, Ill.

27. "Some Good Things to Know About Metal Cleaning" discusses the wide variety of soils resulting from such metal-fabricating processes as heat-treating, forging, rolling, stamping, drawing, extruding, spinning, grinding, machining, buffing, etc., then describes specific materials, equipment and procedures for the removal of these soils.

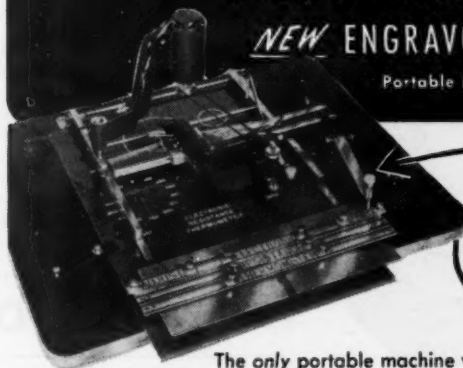
Engrave

... PANELS UP TO 25" WIDE

IN YOUR OWN SHOP WITH THE

NEW ENGRAVOGRAPH

Portable Model 1-S



TRACER
GUIDED FOR
UNSKILLED
LABOR

Send for Booklets
I-S 28—portable
model
H-28—heavy duty
model

The only portable machine which reproduces 15 sizes from one master alphabet.

The only one with adjustable copy holding slides for multiline engraving in one set-up.

Self-centering holding vise for nameplates.

NEW HERMES, Inc.

new hermes
Engravo
graph

13-19 University Pl., N. Y. 3, N. Y.

CANADA: 359 St. James St., Montreal

World's Largest Manufacturer of Portable Engraving Machines

Oakite Products, Inc., 157 Thames St., New York 6, N. Y.

28. The Complete Line of Apex Sockets, Extensions, Adapters and Universal Wrenches are listed in a 122-page catalog containing illustrations, dimensional drawings and complete specifications of more than 5,000 tools. Copies of the new Apex Catalog 29 are available on request to the Apex Machine Tool Co., 1028 S. Patterson Blvd., Dayton 2, O.

29. Steam, Air, Gasoline Traps, 32-page illustrated catalog No. 751, describes thermostatic steam traps for pressures to 225 lbs., expansion steam traps for pressures to 250 lbs., weight-operated steamtraps for pressures to 650 lbs. W. H. Nicholson & Co., 12 Oregon St., Wilkes-Barre, Pa.

30. "Pines Engineering News," a bi-monthly news bulletin, features bending and end-finishing techniques, provides

LUFKIN "LEADER"

chrome-clad steel tapes

give you... **EASY TO READ
MARKINGS**
THAT ARE DURABLE



CHOICE

OF STANDARD OR FOLDING HOOK RING

Famous Lufkin Chrome-Clad finish on tape line gives non-glare readability . . . will not chip, crack, peel or corrode. Black markings are permanent . . . they're bonded to the steel and sunk deeply below the hard chrome-white surface, preventing wear. Vinylite covered case protects against water, stains, and scuffs.

Try out the Lufkin "Leader" at your dealer's . . . check its smooth operation, accuracy, and exclusive features. Choose the Lufkin "Leader" and you are selecting the finest.

BUY THROUGH YOUR DISTRIBUTOR

BUY LUFKIN TAPES — RULES
PRECISION TOOLS

THE LUFKIN RULE CO., SAGINAW, MICHIGAN
132-138 Lafayette St., New York City • Barrie, Ont.

tooling data on outstanding jobs, up-to-date details on new developments and bending applications, and helpful facts concerning short-cut production methods. Pines Engineering Co., Inc., 601 Walnut St., Aurora, Ill.

31. Tracer Guided Engraving Machines and accessories are illustrated and described in an 18-page booklet featuring the portable Engravo-graph Model IM which reproduces any kind of block or script character, numerals, electrical and engineering symbols. It engraves emblems or designs from pencilled lines on cardboard and is also used for profiling of irregular slots, shaping and light contour milling. Illustrations of samples of work executed on this machine are included. New Hermes, Inc., 13-19 University Place, New York 3, N. Y.

NEW BOOKS

Plant layout

By Randolph W. Mallick and Armand T. Gaudrean. Published by John Wiley & Sons, Inc., New York. 1951. 391 pages. \$7.50.

The authors have written this volume, packed with material on the planning and practice of plant layout, to fill the growing need for a scientific approach to such problems. Although it was primarily written with the administrative executive and plant engineer in mind, it was also developed as a handy guide for senior and junior engineers and a reference for engineering colleges and schools of business administration.

This volume features complete engineering techniques for laying out entire plants and modernizing existing layouts. A discussion is made on how to determine plant capacities, balance machine operations, and equip work stations. It stresses conservation of space, profitable use of plant services and scientific analysis of material handling. Several sets of elements, factors,

TWO REASONS WHY

MAUREY

FHP V-DRIVES

BELONG ON YOUR PRODUCT

1. PROMPT SERVICE

No production delays waiting for Maurey V-pulleys, V-Belts, or V-Drives. Fast Maurey service helps speed your output.

2. TOP QUALITY

Maurey V-Drives add sales appeal to your product at no added cost. Attractive Pressed Steel V-Pulleys and machined, smartly finished Cast Iron V-Pulleys look like the top quality they are. MOR-GRIP V-Belts are built to exacting Maurey specifications for maximum flexibility, pull-power and long life.

Maurey Also Builds Special V-Drives For Special Requirements

Write for these FREE Maurey Bulletins:

Bulletin FHP-101 informs about

MOR-GRIP V-BELTS

Bulletin OEM-2000 informs about

HI-Q V-PULLEYS



**PROMPT
DELIVERY**

from complete stocks of
all V-Drive Parts

MAUREY MANUFACTURING CORP.

*World's Largest Manufacturer of Pressed Steel
and Cast Iron Single Groove V-Pulleys*

2906 S. Wabash Avenue • Chicago 16, Illinois

principles, and objectives have been presented in itemized lists and tables. Special business forms reproduced in this volume have been gathered from actual applications in several plants.

Vanadium data sheets

Published by Vanadium Corp. of America, New York. 1950, 80 pages.

This spiral-bound book contains information, in tabulated form, on 180 different compositions on vanadium irons and steels, including construc-

tional steels, spring steels, plate and sheet steels, tool steels, cast steels and alloyed irons. Chemical compositions, heat treatments, mechanical properties and typical uses are shown. There is a detailed index of applications and recommended compositions for each, covering a variety of industrial fields, such as automotive, aircraft, railroad, diesel, etc.

This book is available without charge to qualified persons whose requests are received on company letterhead.



D·S is at work in grinding rooms across the country producing better cutting, longer lived taps, counter-bores, step drills, center drills, etc. Available in hand operated and motor driven models. Have you investigated it? Write today for catalog.

D·S GRINDER DIVISION
ROYAL OAK TOOL & MACHINE CO.
631 E. Fourth St., Royal Oak, Mich.

D·S
RADIAL
RELIEF
GRINDER

Suggestions for sales training meetings

By Sales Personnel Div., U. S. Steel Corp. of Delaware, Pittsburgh, Pa. 1950, 84 pages.

How to plan and conduct an effective sales training meeting is the subject discussed in a compact and informative handbook containing numerous cartoons which catch the reader's eye. It is also helpful in planning meetings of any type.

The first two chapters deal with the details necessary in the planning and preparation of a successful sales training meeting. The next two chapters are concerned with the meeting itself—how to assemble the group, how to present the material, how to conclude the discussion and, finally, how to appraise the meeting and its effectiveness. Chapter five summarizes the preceding material and is followed by a ten-page appendix containing a comprehensive

STOP DUSTS INSTANTLY

with

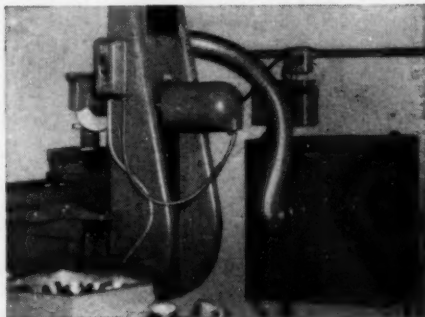
DUSTKOP

Available from stock of 22
standard models

300 cfm to 10,000 cfm

for: Surface Grinders, Tool and
Cutter Grinders; Polishers and
Buffers; Abrasive Belts and Discs;
Woodworking and Plastic Indus-
try Equipment . . . DUSTKOPS
collect almost all kinds of
industrial dusts.

Ask for Catalog 605-2. Describe
dust problem for recommendation
by return mail — no obligation.



AGET-DETROIT CO.

205 Main St.

Ann Arbor, Michigan

for greater **RIGIDITY**
more **ACCURATE** cuts



use
CRITERION

CRITERION
machine
WORKS

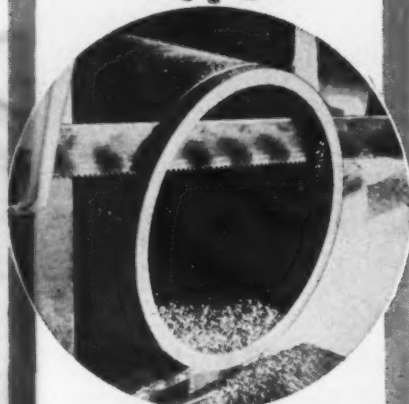
**BORING
HEADS**

A full line of adjustable boring
heads and bars now available.
Heads 1 1/2" to 7" dia. Carbide or
high speed bars 3/8" to 1 1/4" dia.
Lead screws ground **AFTER**
HARDENING. Ample bearing
surface, heat treated parts, in-
terchangeable shanks. Criterion
tools are the criterion. Write for
free catalog and costs.

9312 SANTA MONICA BLVD. • BEVERLY HILLS, CALIF.

MILFORD

WAVY SET



CLEARs

AS IT CUTS

The Wavy Set design, originated by MILFORD, assures faster, straighter cutting by clearing the chips from the cutting area. Teeth set deep into saw stock practically eliminate tooth-rippage — add hundreds of hours to blade life. This uniform excellence is found in all MILFORD Wavy Set band saw blades.



Resistor & Duplex Hack Saw Blades
Profile and Band Saw Blades

THE HENRY G. THOMPSON & SON CO.

SAW SPECIALISTS EXCLUSIVELY

FOR 75 YEARS

1876  1951

NEW HAVEN 5, CONN. U.S.A.

SOLD THROUGH SELECT INDUSTRIAL DISTRIBUTORS

check list for use in preparing and conducting a meeting.

A limited number of copies are available without cost and may be obtained by writing to Sales Personnel Div., U. S. Steel Corp. of Delaware, 436 7th Ave., Pittsburgh 30, Pa.

New Industrial Films

The Air-Gage tracer

23 minutes running time. 16-mm. black and white, without sound. Prints available from Monarch Machine Tool Co., Sidney, Ohio.

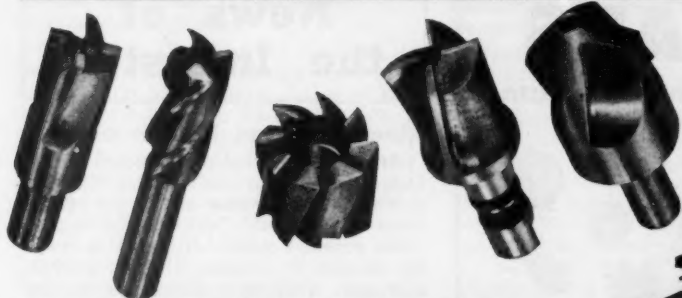
This industrial film demonstrates the recent contribution to tracer-controlled duplication of machined parts by Monarch's now well-known "Air-Gage Tracer." The picture brings out the variety of typical job applications relating to contour turning, facing and boring as well as multiple-diameter shaft turning on Monarch engine lathes from 10" to 32" which have been equipped with the Air Gage Tracer. The film includes a complete discussion of both design and operational principles upon which this ingenious duplicating device is based.

Production miracles through "Controlled-Air-Power"

28 minutes running time. 16 mm. black and white, with sound. Arrangements for showing this film can be made by applying to W. C. Richards Jr., The Bellows Co., 222 W. Market St., Akron 9, Ohio.

This is a case history film, showing the use of "controlled-air-power" in effecting cost reductions in a wide variety of manufacturing processes. Camera crews "shot" many thousands of feet of film in plants all over the nation, ranging from small firms employing only a few workers, to giant plants with thousands of workers.

Scenes shown include actual production operations, indicating in detail how the application of Bellows "controlled-air-power" devices to standard and special machine tools have cut costs, increased production and reduced worker's fatigue in such operations as milling, drilling, tapping, grinding, etc.



Write for
Bulletin 90FM
Hydraulic
Flutemiller

WORK DONE BY THIS AUTOMATIC FLUTEMILLER

- Mills straight and spiral flutes
- Low in cost
- Mills tool automatically, no attention required
- No special skill

The WARDWELL Mfg. Co.

3165 FULTON RD.

CLEVELAND 9, OHIO



The COLBORNE SPEED LATHES



**SPEED UP FINAL OPERATIONS NO
DIES • GEARS • SCREWS • LONG RODS**

A recent addition to the COLBORNE line of Speed Lathes is the Series 30 machine. This speed lathe is indispensable for economical polishing, grinding, burring and lapping.

Very compactly constructed to do highest quality work with the COLBORNE features of spindle bearings running in oil, instant stopping brake, easy opening collet and standard speeds of 600-920-1720-3280-4800 RPM using ¾ H.P. motor and cone pulleys. Collets and chuck may be used.

For more production per day choose COLBORNE.

COLBORNE MFG. COMPANY

BUILDERS SINCE 1879

157 DIVISION ST.

CHICAGO 10, ILL.



PROMPT DELIVERIES
Write for Details Today

GEARS

Small and Medium

SPURS
(internal
and external)

HELICALS

STRAIGHT
BEVELS

SPROCKETS

RACKS

WORMS

WORM
GEARS

THREAD
GRINDING



COMPLETE
GEAR
TRAINS

Send us your blueprints for estimate

BEAVER
GEAR WORKS, Inc.
1033 Parmelee St., ROCKFORD, ILL.

HERE'S HOW TO GET
**HIGH PRODUCTION
MICRO FINISHES!**

Equip with ...

CITCO*
AUTOMATIC, ADJUSTABLE
HYDRAULIC
DIAMOND
TURNER

More pieces per
dress! Eliminates
human error!
AVAILABLE FOR
Cincinnati Center-
less, Landis Ca-
mamatic, I. W.
and Heald Inter-
nal Grinders.
Write, Phone,
Wire!



FOR PRECISION WORK—INSIST UPON
CITCO "SOLID COPPER" DIAMOND TOOLS!

Fast re-setting & re-lapping service. Special
attention to Defense Contract problems.



News of the Industry

Niagara moves Detroit office

Announcement of the removal of the Detroit branch of the Niagara Machine & Tool Works to new and larger offices from the General Motors Building to 15484 James Couzens Highway is made by Russell J. Caplin, Detroit Branch Manager. This new address is in the newly developed section becoming known as "Machine Tool Row."

Caplin stated, "These new increased office and engineering facilities will expand our service to industries throughout the Detroit territory and will further enhance the value and acceptance of Niagara equipment."

Federated establishes midwestern department

Edgar L. Newhouse, Jr., vice-president of American Smelting and Refining Company and head of its Federated Metals Division, announces the establishment by Federated of a midwestern department and the appointment of Carl J. Gross as its general manager.

The midwestern department comprises the states of North and South Dakota, Minnesota, Michigan, Wisconsin, Indiana, and parts of Illinois, Ohio, Iowa, and Kentucky. Federated has two producing plants in this territory at Whiting, Ind. and Detroit, Mich. Both will be under the direction of Mr. Gross who will continue as manager of the Whiting plant. Allan Nichamin, formerly Detroit sales manager, has been appointed manager of the Detroit plant to succeed Robert Ruch, resigned, Waldo C. Larson continues as superintendent at Detroit.

The appointment of Dr. James F. Eversole as Manager of Research Administration of Union Carbide and Carbon Corporation, 30 E. 42nd St., New York 17, N.Y., has been announced by Dr. George O. Curme, Jr., vice-president in charge of research.

Alcoa expands laboratory research facilities

Aluminum Company of America is expanding its research facilities with the erection of a new building at the company's Aluminum Research Laboratories at New Kensington, Pa., according to Dr. Francis C. Frary, ALCOA's director of research.

The new unit—measuring 80 by 170 feet—is needed to relieve congestion and to extend ALCOA's research facilities to meet increasing demands of the national defense program. It will increase total floor space at the laboratories by about one-third. Construction is already under way, and the building will be ready for occupancy early in 1952.

C. W. Miller has been named manager of Large Power Transformer Engineering for the Transformer Division of the Westinghouse Electric Corporation at Sharon, Pa. He succeeds the late W. G. James, who died unexpectedly on August 10.

Simonds moves Chicago branch office

The Simonds Abrasive Co. has moved its combined office, shop and warehouse from 127 South Green St. to 3323 West Addison St., Chicago, Ill. With 40,000 square feet of floor space all on one level, stock areas are now much larger, aisles are wider, order filling and handling is greatly simplified. In the increased shop areas much new machinery and equipment as well as improved repair and emergency manufacturing facilities have been added.

WIRE ROPE QUIZ

Answer to quiz on page 151

1. 6 of 37 wires
2. 8 strands of 19 wires
3. 7
4. Two circumferences
5. Open hearth
6. Seven
7. One fifth
8. Same
9. 6
10. Strands twisted to right and rope to left.



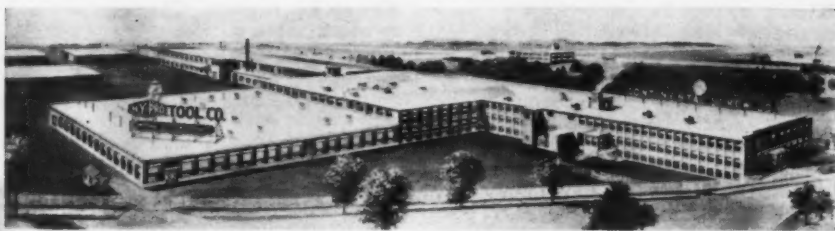
Cut grinding costs . . . with rugged QUEEN CITY Grinders

Queen City Grinders are built to stand up under the heavy work that pours through the shop daily. Noted for their durability, freedom from downtime and low cost, Queen City Grinders cut grinding costs to the bone. • Order today a battery of these low cost grinders and eliminate "ganging up" around one lone grinder.

**QUEEN CITY
MACHINE TOOL CO.**

**QUEEN CITY
Machine Tool Co.
235 E. 2nd St.
Cincinnati 2, Ohio**





Hy-Pro Tool Company, although still a subsidiary of the Continental Screw Co., now occupies its own new building on the grounds of and adjacent to the parent company in New Bedford, Mass. Hy-Pro manufactures a complete line of high speed, high production, precision ground steel taps, slotting saws and metal cutting tools.

The new building is of modern brick, single-story construction. It contains more than a full acre of floor space and is equipped with the most modern automatic tap-making machinery available. Special attention has been given to illumination and materials handling methods and equipment.

The appointment of **Charles M. Harnish** as manager of order service for the Westinghouse Electric Corporation's Motor and Control Division, Buffalo, N.Y., has been announced by Louis R. Botsai, manager of the Division.

William H. Holding has been appointed industrial sales manager for both the Stamford, Conn., and Salem, Va., Division of The Yale & Towne Manufacturing Co., it was announced recently by A. Charles Amann,

WITH ROOFE LIVE CENTERS

YOU CAN BE SURE!



Write now for
complete
catalog of all
types of
ROOFE
Live Centers

Users everywhere report increased production . . . lower costs . . . longer life . . . maximum accuracy with ROOFE Live Centers on the job.

Illustrated: ROOFE Standard Type Live Center available in Morse Taper, Brown & Sharpe, Jarno, Straight or Special shanks to your specifications.

HOUSTON GRINDING & MFG. CO., INC.

2110 QUITMAN STREET — HOUSTON 10, TEXAS.

Reliable Distributors Wanted

A.S.A. approves new gear standards

The American Standards Association has announced its approval of a standard for Inspection of Fine-Pitch Gears, B6.II-1951, covering general gears; spur and helical gears; worms and worm gears; bevel gears; backlash in gears; comparator layouts; gear blanks for fine-pitch gears; pin measurements; fine-pitch master gears; and surface roughness of gears. Fine-pitch gears are defined as gears of 20-diametral pitch and finer.

The new American Standard is based on a combination of the AGMA standards. However, a completely new section on surface roughness requirements for gears has been included. The recommended maximum roughness height values range from $\frac{1}{2}$ to 1000 micro inches, and the recommended maximum waviness height values from 0.00002" to 0.020". Also included in this new section are: definitions; specification of roughness width, waviness width, height of roughness and waviness, and lay; measurements or evaluation of roughness; surface symbols; symbols indicating direction of lay; and symbols indicating gear tooth zone.

This standard is part of the gear standardization program developed by a committee organized under the procedure of the American Standards Association, and sponsored by the American Gear Manufacturers Association and the American Society of Mechanical Engineers.

GENERAL INFORMATION QUIZ

Answers to quiz on page 220

1. Any side
2. Less
3. 50 to 65 per cent
4. No sparks
5. 60 to 70 per cent
6. High
7. 160 degrees
8. Shrinkage
9. Reservoir beneath
10. 65 per cent



Model "400"



HORIZONTAL or VERTICAL

4" ABRASIVE BELT GRINDER

Eliminate costly hand filing, grinding, deburring and many other operations . . . There are "101" applications for the 400 in your plant. Write for bulletin.

Hammond Machinery Builders

1614 DOUGLAS AVENUE KALAMAZOO 54, MICH.

High Speed

**COUNTERBORES
BACK
SPOT
FACERS**



Interchangeable

*Catalog
on
Request*

BICKNELL-THOMAS COMPANY

Greenfield Massachusetts

Cleveland firm honors Harvey J. Corrin, 50-year employee

The Cleveland Punch and Shear Works Co., 3917 St. Clair Ave., Cleveland, O., held a special assembly of all personnel on Aug. 30, 1951, to honor the first worker to spend 50 years with the company. He is Harvey J. Corrin, vice president, who in 1901 joined the organization at the age of 16, as a junior office boy. During the following years, Mr. Corrin progressed through the cost and sales departments becoming sales manager in 1918. He was elected vice president in 1941. In recognition of his 50 years of service, Mrs. Florence M. Sayle, president, presented him with an all-expense paid vacation to Mexico and two handsome traveling cases.

In commenting on his 50 years' service, Mr. Corrin briefly reviewed the tremendous expansion in the company's machine tool business during that period. Much of this is due to the growth of the automotive and other industries which were in their infancy during his first years with the company, he stated.

Lincoln Arc Welding Foundation awards

Engineering honors and cash awards totaling \$5000 have been given by the Lincoln Arc Welding Foundation, Cleveland, Ohio, to 63 young engineers in 28 different states, representing 34 different engineering schools.

The awards were made in the fourth competition of the Foundation's Engineering Undergraduate Award and Scholarship Program. The Program offers awards for papers by engineering undergraduates on the design, fabrication, research of maintenance of machines or structures in which arc welding is used.

In honor of Hugh M. Rush, who received the First Award of \$1,105.03, Purdue University will receive \$1,000 to establish four scholarships in the Department of Mechanical Engineering in which Rush was enrolled when he prepared his award paper, "Hydraulic Cranes for Military Vehicles."

For his paper, "A Comparison of Riveted and Welded Design on a



SAVE TIME! REDUCE COSTS!

WITH
UNIVERSAL TOOL HOLDERS



HOLLOWING OUT
LEFT SIDE FACING
PLAIN TURNING
RIGHT SIDE FACING
GROOVING
BORING UNDERCUTTING OR INTERNAL THREADING
OUTSIDE THREADING
SHOULDER TURNING OR FACING

These handy, universal tool holders have two bit openings and quick change bit tightening device. Straight, right or left hand position. Used for all lathe, shaper and planer operations. Bit sizes — carbide or steel: 1/4", 5/16", 3/8", 7/16".

ACME TOOL CO.
71 West Broadway
New York 7, N. Y.

Through Plate Girder Railroad Bridge," Walter H. Halstead received the Second Award of \$552.50 and Lafayette College received \$500 to establish two scholarships in the Department of Civil Engineering in his honor.

The third Award of \$276.25 was made to Paul E. Potter for his paper, "An All Welded Steel Bridge," and in his honor Oregon State College received \$250 for a scholarship in the Department of Civil Engineering.

Dates for the next annual competition have been announced by the Foundation as June 1, 1951 to May 31, 1952. All engineering undergraduates are eligible to participate while they are registered as an undergraduate. Rules are available from The James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

Simonski Company moves to own quarters

The Gilbert S. Simonski Co., makers of Lucifer electric furnaces, formerly of 401 North Broad St., Philadelphia, has moved to its own modern brick building on Easton Pike (Route No. 611) in Neshaminy, Bucks County, Penn. The structure is of one-story fireproof construction. The telephone number is Hatboro 0411.

Following the recent, untimely death of Gilbert S. Simonski, founder of the business, Anthony Lipsi, Mr. Simonski's long time associate and production manager, has been appointed general manager of the furnace manufacturing firm.

Carpenter Steel buys Webb Wire Works

Purchase of the Webb Wire Works, New Brunswick, N. J. is announced by The Carpenter Steel Co., Reading, Pa. Webb manufactures needle wire, stainless steel spring wire, and other specialties in small diameters down to .0025".

Ernest H. Webb, president, is retiring, but continues for the time being as management consultant. Carpenter has appointed Everett F. Waltman as manager. Other personnel remains unchanged. The plant will continue to manufacture the same products for the same markets from the same location.

DESIGNERS BUILDERS

**All Types of Holding
Fixtures for Machine
Shop Production**



**FIVE
LOCK
SIZES**

75 Various Model and Fixture Sizes



**CATALOG 941
AVAILABLE**

REPRESENTATIVES

SYRACUSE Arthur Irvine	LOS ANGELES Technical
CLEVELAND Production	Broaching Co.
Tool Co.	NEW ORLEANS
MILWAUKEE Geo. M. Wolff Co.	Engineering
HOUSTON-DALLAS Engineering	Sales Co.
Sales Co.	CINCINNATI R. W. Pratt
CHICAGO Ernie Johnson	BOSTON A. R. Shevlin
PITTSBURGH Tool Engineer	& Co.
Products	TOLEDO Peerless Tool
PHILADELPHIA Morgan Tool	Service Co.
Equipment Co.	CANADA Firth Brown Tools,
	Ltd.
	Galt, Ont.

SWARTZ
TOOL PRODUCTS CO., INC.
Telephone WE 3-1522
13330 Foley Ave.
Detroit 27, Michigan

National Eutectic Welding Institute

Eutectic Welding Alloys Corporation, Flushing, N.Y. established in 1950 the National Eutectic Welding Institute as a permanent organization devoted to the proper applications of the Eutectic process of joining metals at lower heat than the base metal with the use of Eutectic's "Low Temperature Welding Alloys." The Institute is available at a nominal charge to all technical employees in the welding field, including welders, engineers, mechanics, foremen, superintendents, plant managers and others who are seriously interested in improving their knowledge of metal-joining techniques.

The Institute provides all metals for individual welding of samples as well as larger pieces for interesting group work. Welding equipment for oxyacetylene and electrical welding are made available in sufficient quantities free of charge. The course itself consists of five days of intensive training, demonstrations, lectures and practical bench work. Classes are held continuously,

beginning on Monday mornings, at weekly intervals. Up to the present, several hundred applicants have already "graduated" from the course.

A.S.T.E. conference in Evansville

Plans for the first South Central Area conference of the American Society of Tool Engineers, on October 19th and 20th, have been announced. The meeting, sponsored by 12 A.S.T.E. chapters in a 250 mile radius in southwestern Ohio, Indiana, Illinois, Kentucky, Tennessee and Missouri, will be held in Evansville, Ind. The respective chapters are located in St. Louis, Dayton, Cincinnati, Peoria, Indianapolis, Nashville, Louisville, Decatur, Springfield, Richmond, Muncie and Evansville. Invitations have also been issued to the membership of the Atlanta, Georgia and Piedmont (N. C.) chapters of the Society.

Included in the two-day program are three technical sessions, one of which is in the nature of a general panel dis-

New! Pencil-size POCKET MICROSCOPE

MAGNIFIES AREA
400 TIMES (20X)

PRECISION-BUILT
SHARP IMAGE

NOTHING
TO ADJUST



ONLY \$2.98

Every Machine Shop Needs One

Remarkable for inspection of all kinds of materials, metals, plastics, tool edges, grain structures, small parts, etc. Useful in many industries. Every mechanic should be equipped. Replaces costly microscopes. Instant focus. No adjustments. Wide field. Satisfaction guaranteed or refund. 40 POWER, \$3.95.

DuMAURIER CO.
Dept. 1311 Elmira, N. Y.

REPRINTS

of Special Reports
are still available

Reprints of some of the Special Reports which have been published in this magazine are still available at no charge. These include: Milling Machines; Honing, Lapping and Superfinishing Machines; Automatic Screw Machines; Chucking Machines; Turret Lathes, Hand Screw Machines; Broaching Machines; Shapers, Slotters and Keyseaters; Lathes (in three parts); and Planers.

**Machine and Tool
Blue Book**
222 E. Willow Ave.
Wheaton, Ill.

cussion of major problems confronting tool engineers today.

Also on the program is a discussion of recent developments in carbide tools and dies by J. S. Gillespie, of the Carbonyl Department of General Electric Co., and a session to be devoted to other tools and methods for defense production.

Yoder Company building tube mill for Lone Star

The Yoder Company, 5509 Walworth Ave., Cleveland 2, Ohio, is building for the Lone Star Steel Co., Dallas, Texas, an electric resistance-weld tube mill with a capacity for making line pipe and casing in sizes from 4½" up to 16" o.d., in thicknesses ranging up to 9/16".

The mill will handle either piled skelp or coiled strip, and will have a welder of unusually high capacity—one of the largest of its kind ever built.

This will be the third complete electric resistance weld tube mill built by Yoder since World War II for making pipe and tubing up to 14" dia. and larger.

Including the Lone Star mill, there will be a total of six large resistance-weld continuous mills in operation in the U.S.A. and Canada, five will have been built wholly or partly by Yoder.

Pivot Punch & Die Corp expands plant facilities

Robert H. King, president of Pivot Punch & Die Corporation, North Tonawanda, N. Y. has announced a recently completed addition to their factory which adds 20% to their working area. The expansion was necessitated because of increased defense orders for special tools and because of the acceptance with which machine shops all over the world have received the companies recent standardization of punches. This new Pivot Punch service, offering 276,000,000 punch sizes and styles, giving divisions, prices, ordering information and typical applications, as well as factors affecting best results, has resulted in orders taxing the companies output.

Roger S. Ahlbrandt has been elected treasurer of Allegheny Ludlum Steel Corporation and assumed his new duties September 1.

ROLL FEEDS



STILL AVAILABLE EARLY DELIVERY



- Fits Any Press
- Can't Slip
- Reverses Instantly
- Feeds in Thousandths
- Maintains Original Setting

Roll Feeds are available for all types of presses . . . for side or rear feeding. All attachments for installation are furnished including adjusting disc and connecting linkage. Roll Feeds can't slip as each wedge has four points of contact. Instantly reversed by merely shifting the feed finger spring from one lug to the other. A unique feature enables stock to move through the rolls with accuracy measured in thousandths! No ratchets or pawls to wear down and throw off feed spacing . . . original setting is always maintained. Friction discs and strip-feeding rolls are made of steel, hardened and ground. Bearings are of hard bronze. Roll Feeds are built to endure hard and long usage . . . and still hold to accuracy. Your presses can be made more efficient with Roll Feeds . . . models available to fit all sizes of power presses. Quality built for long dependable service. Write today for illustrated folder with diagrams and specifications. It's yours for the asking . . . so write now.

Also Manufacturers of Stock Reels.

ROLL FEEDS CORPORATION
Pawtucket, Rhode Island
An Electrix Affiliate

Tomco Products Co. announces standard stock items

Vitas Thomas, proprietor of the Tomco Products Co., 1633 Douglas Ave., Racine, Wis., has announced that orders on standard items of Hand Wheels, Hand Knobs and Machine Handles manufactured by his firm can now be filled immediately from stock.

Mr. Thomas established the Tomco Products Co. in early 1950 manufacturing specially designed hand wheels, knobs and handles to manufacturers' specifications.



William H. Nichols



Vitas Thomas

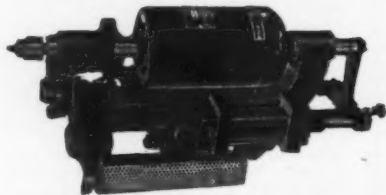
William H. Nichols, 1873-1951

William H. Nichols, 78, inventor and president of W. H. Nichols Company, the firm he founded fifty years ago, died August 9 at his home, in Waltham, Mass. Mr. Nichols was born August 7, 1873, in Hamilton, Ontario, and he undertook his first business venture at 16, the operation of a bicycle building and repair shop.

He served his apprenticeship as a toolmaker at the Pratt & Whitney plant, later working in the Stanley Works, the Veeder Corp. and the American Watch Tool Co. After several moves and expansions Nichols established his present shop at 48 Woerd Ave., Waltham, Mass. During both World Wars the plant turned out much essential war material.

Mr. Nichols received the National Association of Manufacturers "Pioneer Award" as one of 26 pioneer inventors in the New England States. He was a member of the Newcomen Society of Engineers and the New England Live Steamers, an association of men interested in model railroads and steam-driven locomotives.

How to Simplify Production-Precision Drilling of Holes From .004" to .156" Diameter

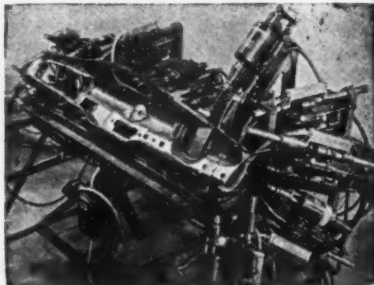


USE THESE COMPACT DRILL UNITS FOR SIMPLE OR COMPLICATED SET-UPS

These modern drill units speed-up many simple drilling jobs and simplify complicated multi-spindle jobs. Direct drive variable speed spindle provides speeds from 1000 to 10,000 or 2,500 to 15,000 RPM.

THE ELEC. RO-MECHANO CO.

263 EAST ERIE STREET
MILWAUKEE 2, WISCONSIN



Sixteen Electro-Mechano air feed models electrically interlocked and controlled to drill miscellaneous holes in automobile dash board.

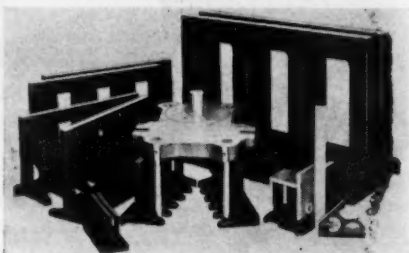
AVAILABLE WITH AIR OR HAND FEED-VARIABLE SPINDLE SPEEDS

Illustrated is the 8" model with air feed and hydraulic control.

Write for Bulletin BB-650.

The **M P** **MAGIC PARALLELS**

Arrest Lost Time

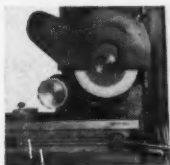


A SIZE FOR YOUR NEEDS

and **M** **MAGIC DIAMOND HOLDER**

Saves Machines for Defense

- Elevation Screw and Nut
- Spindle Housing or Knee Ways
- Gears and Bearings



**O
U
T
S
I
D
E**



**I
N
S
I
D
E**

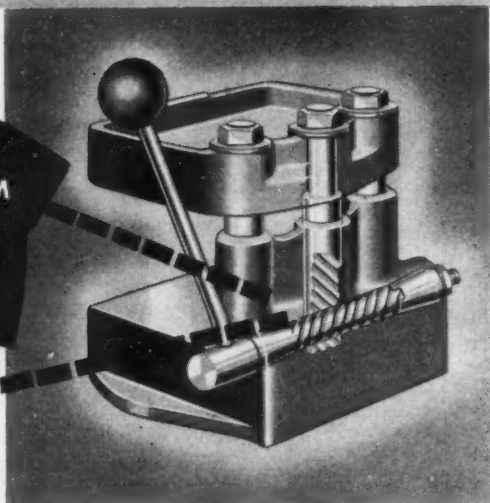
SALESMEN WANTED

**Write for
Circular
and Prices**

MAGIC CITY MACHINE TOOL CO.
Dept. BB 2128 S. Walnut Muncie, Ind.

LOCKING
MECHANISM
WEARS IN
—NOT OUT

"CONE-LOK"



THE JIG WITH A LIFETIME* *Guarantee* ON THE LOCKING MECHANISM

● Just think of this. It's no longer necessary to carry an inventory of spare parts. And when you eliminate costly inventory you save again in storage space and taxes! Add to this the saving on maintenance costs and down time on production. Don't overlook these values when planning your 1950 program. Write for literature, complete details.

* We absolutely guarantee forever the locking mechanism on the Cone-Lok.

WOODWORTH

N. A. WOODWORTH CO. • 1300 EAST NINE MILE ROAD • DETROIT 20, MICHIGAN
PRECISION GAGES • DIAPHRAGM CHUCKS • CONE-LOK JIGS • PRECISION PARTS

MODERN TOOLS

*in
ACTION*

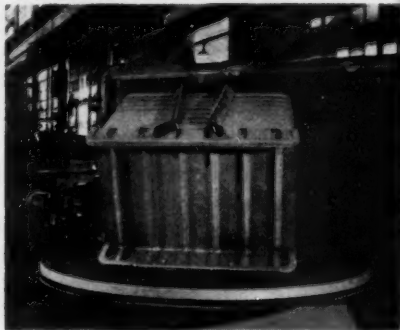
Usable lives of tote boxes increased by airless abrasive cleaning

To increase the usable lives of its tote boxes, Caterpillar Tractor Co., Peoria, Ill., has begun a program for reconditioning them. The complete set of equipment for the reconditioning process is not ready yet, but some cleaning, rinsing, and painting operations are now being carried on. Chipped paint and accumulated rust are removed from the boxes in an airless blast cabinet designed for continual cleaning by American Wheelabrator & Equipment

Corp., Mishawaka, Ind. Each box requires 2 minutes of blasting time.

The front of this cabinet has two doors, either of which can completely close the cabinet. A 66" rotating work table is mounted on each door. As a door is closed, the table moves into the blasting zone; when the door is opened, the table comes out for loading. An operator can maintain a continual cleaning schedule because while one table load is under the blast, he can load the

Before and after . . . The tote box on the left has not been cleaned, whereas the one on the right has just been removed from the airless blast cabinet.



other table and have it ready for blasting when the first one comes out.

Caterpillar Tractor Co. has placed a fixture on each table for holding the boxes so that all surfaces are completely covered by the abrasive thrown from two rotating wheels. Each box is blasted in two positions, with one

minute time required in each position. Caterpillar has approximately 187,000 tote boxes which it intends to put through the reconditioning program. Each box will go through reconditioning every 2½ years, and it is expected that the normal lives of the boxes will be doubled.

Transfer machine performs 83 drilling operations

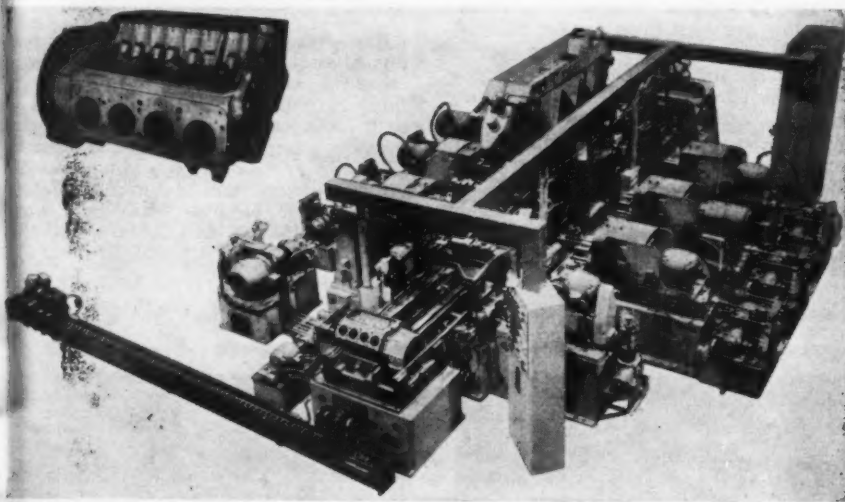
There are a total of 83 drilling operations performed on the ends and angle surfaces of a V8 automotive block. The machine can be operated by one man at the central control station. It is arranged so that production can continue without any one of the individual units. It is also possible to operate the machine with the work piece delivered to

any one of the stations for a single operation.

The machine consists of 14 hydraulic and air trav units equipped with auxiliary heads, conveyor system, automatic lubricating system, chip conveyor system, 7-station transfer mechanism with fixtures for holding parts while at various stations.

Production is 52 blocks per hour.

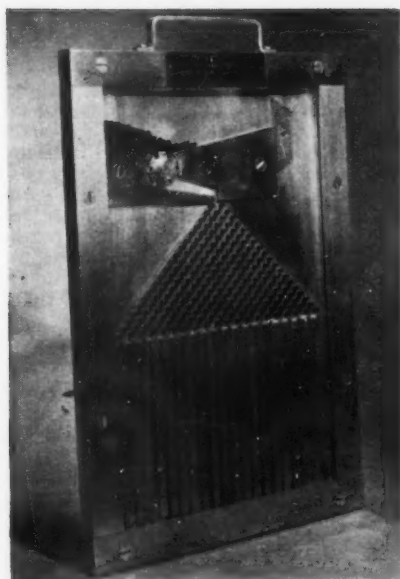
Special seven-station transfer machine



Effectiveness of quality control chart shown by small demonstrator

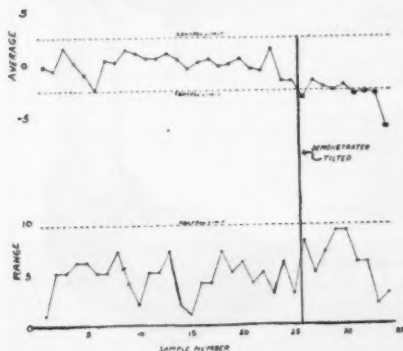
"What can one of these quality control charts do for me?" asks Joe Dun, foreman of a department. Most fore-

men are not easy to convince on the advantages of management's new tools, when you just sit down and talk about it. Why—because we have heard many times, "I don't need high-powered mathematics to run my department". This first impression can be nullified by using a visual aid in showing just



The Quality Control Demonstrator . . . A visual aid showing how a control chart will indicate needed machine adjustments.

Chart . . . used with the Quality Control Demonstrator. Note that the values, as plotted on the chart, vary as the demonstrator is tilted.



how a control chart will indicate when a machine needs adjustment or repair.

The small, portable demonstrator pictured above has been very successful in showing the effectiveness of a quality-control chart. The balls are dropped one at a time, in order that two will not touch each other while in the maze of pins. After five are resting on top of the rod, the average and range is plotted as shown on the control chart illustration. The range is the maximum number of slots between the balls of any sample above the rod which equals the maximum numerical difference between the various slots in which balls of the sample rest. The rod is then pulled and the balls drop to the base of the demonstrator.

This procedure of dropping five balls as a sample is continued until twenty-five samples have been dropped, evaluated and plotted on the quality control charts. Quality control limits are then calculated, by arithmetic, and placed upon the charts. The complex mathematical calculations are made that simple, while at the same time embodying the law of probability. These control limits then are the maximum extremities that the demonstrator is expected to operate within, unless another cause of variation is added.

The effectiveness is then dramatically shown by extending the control limits and placing a rubber eraser $\frac{5}{8}$ " under one corner of the demonstrator. Now, by dropping more samples you will find that the values plotted on the chart go out of control very quickly. This shows that something has been changed to give different results, which in this case is the eraser.

However, when a control chart is used on a machine, causes for variation are not purposely added, consequently control chart is a very effective tool to show when the machine is operating in or out of the normal, expected variation.

This type of demonstration also shows (when the demonstrator is not tipped during the demonstration that the pattern of a controlled process always follows a bell shaped or normal curve. From this point on, more tech-

nical aspects can be discussed and explained.

The Quality Control Chart Demonstrator is patterned basically after an old museum and university curiosity known as the "Statistical Quincunx" invented by Sir Francis Galton in the latter part of the 19th century. The name "Quincunx", as the demonstrator is often called, is derived from Latin meaning "five ounces". The five-ounce weight was marked by 4 dots at the corners of a square and a fifth in the center.

By the use of this device, the natural law of probability and the principles of quality-control charts can be demonstrated more quickly and effectively than by other more laborious and time-consuming methods. The 300 one-eighth inch steel balls, blackened by "Black Magic", can be released quickly or slowly as desired by the manual rotation of the notched wheel. After passing through the maze of fiber pins the balls drop into slots and build up a frequency distribution which is a good approximation of the "Normal Curve".

The demonstrator is $9\frac{3}{4}$ " x 14" x 15",

weighs $7\frac{1}{2}$ pounds and is of basic aluminum construction. A small spirit level on the back checks plumbness and a hinged easel holds the device in the proper position.

When performing a control-chart demonstration, we have found it effective to cover the space below the pull wire with a piece of cardboard or paper. Balls are dropped in groups of five, slot number values recorded, and regular X and R control charts are constructed. A simple explanation is made of the theoretical percentages of balls that should fall in the +1, +2, and +3 zones. The cover is then removed and the distribution analyzed. Analyses have been very close to the theoretical numbers for each zone.

"Out of Control" conditions may be demonstrated by placing an eraser or other object $\frac{1}{4}$ " to $\frac{1}{2}$ " thick under one side of the Quincunx. One half inch "tilt" will change the X about 3 units and cause approximately half the points on the X chart to be beyond the control limits. The range is not significantly affected.

AIR-MITE

(AIR OR SPRING RETURN)

Completely Flexible

AIR-MITE now supplies solid steel upright columns in any lengths required to give you these important flexibility features:

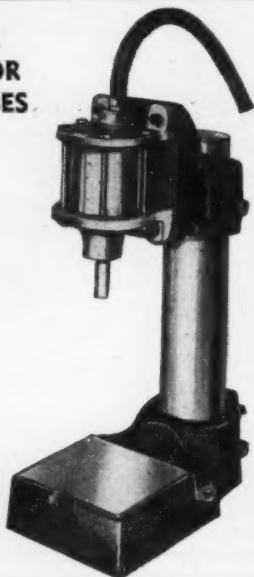
- 1 Normal ram clearance of 0" to 6" may be increased to any clearance required for special application.
- 2 Supplementary or replacement cylinders with any ram stroke required are available for quick, easy mounting on same brackets.
- 3 Rapid socket wrench adjustment cylinder bracket swivels for perfect alignment with work.

Presses, are available in $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1 ton capacities — for staking, riveting, marking, punching and similar operations.

Write for complete catalog of Air-Arbor Presses and single and double acting Air Cylinders.

AIR-MITE 4417-G West Carroll Ave.
CHICAGO 24, ILLINOIS

AIR
ARBOR
PRESSES



**NOTCHING TUBING OR
PIPE ENDS EASILY WITH**

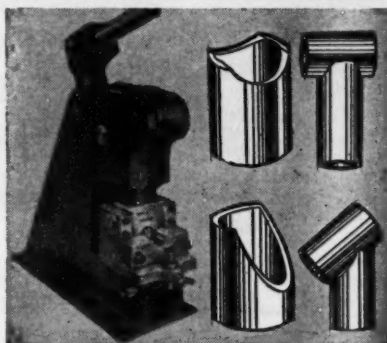
ARC-FIT *

Reg. U.S. Pat. Off.

**IN POWER PRESS
OR HAND PRESS**

Arc-Fit is a notching unit for preparing pipe or tubing ends in making welded or brazed tubular joints. Arc-Fit will prepare the ends of a pipe or tube in less than 5 seconds. Arc-Fit is a production tool that will cut your production costs. It is applicable in any industry where pipe or tubular construction is used.

- Arc-Fit can be utilized in any power press.
- Arc-Fit can be furnished for any size tubing or pipe.
- A hand press can be supplied with Arc-Fit units for shearing pipe or tubing sizes 2 inches or under.



- For sizes over 2", angular cuts other than 90°, and slotting operations. Quotation furnished on request.
- Arc-Fit does not deform pipe or tube. No grinding or finishing operation is needed.
- Engineers can now design for tubular construction and cut costs.

Write today for circular and prices.

Manufactured Exclusively by

VOGEL TOOL & DIE CORPORATION

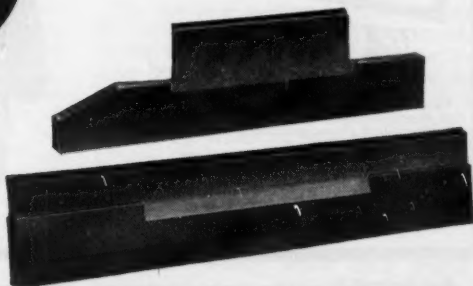
1825 N. 32nd Street

Melrose Park, Illinois



**CARBIDE TIPPED
Work Support Blades
for CENTERLESS GRINDERS**

Standard thrufeed and in-feed work support blades available from stock. Prices on special blades quoted on receipt of prints.



WILLEY'S CARBIDE TOOL CO.

SOLE MAKERS OF WILLEY'S METAL

1342 W. Vernor Highway

Detroit 1, Michigan

IT'S THE **Cost per Cut** THAT Counts

Study these high production, low cost figures on three Motch & Merryweather Circular Sawing Machines

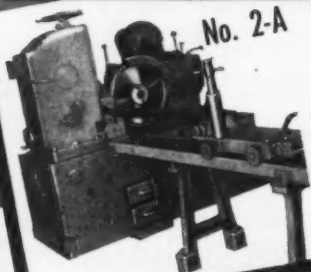
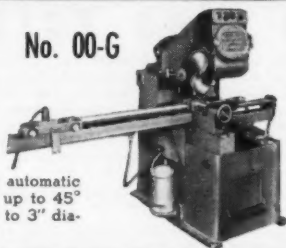
Make your own study of the cost per cut in your metal-sawing department. Then find out from Motch & Merryweather how much production at lower cost you can get on M. & M. Circular Sawing Machines, using our Triple-Chip blades.



Operation: Steel door frames (mitre cut).
Material: Rolled steel shapes 6" wide x 1/16" thick.
Production: 200 pieces per hour.
Tool cost per piece: \$.0002.

M. & M. No. 00-G Circular Sawing Machine. Manual or automatic stock feed. Readily adaptable to making cuts at angles up to 45° as well as high production square cut-off. Capacity: up to 3" diameter round; shapes—up to 3-3/8" x 6".

No. 00-G

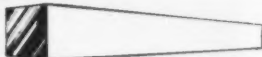


No. 2-A



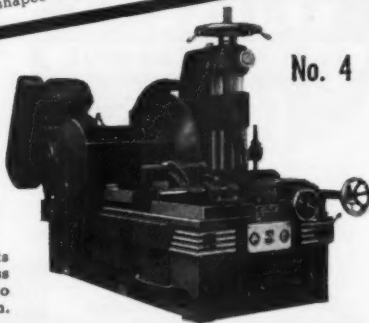
Operation: Rocket nozzle stock cut to length.
Material: S. A. E. 1020, 5" diameter.
Production: 60 pieces per hour.
Tool cost per piece: \$.001.

The No. 2-A machine pictured at the left has automatic stock feed up to 72" cut-off lengths. It is offered also with manual stock feed. Capacity: up to 6-1/2" diameter round; structural shapes—up to 5" x 12".



Operation: Forging billets cut to length.
Material: S. A. E. 1045, 14" square.
Production: 6 pieces per hour.
Tool cost per piece: \$.12.

No. 4. Widely used in steel and structural steel plants and forge plants sawing all types of forging, stainless and titanium alloys, die block steel, etc. Capacity: to 17" dia. round; structural shapes up to 24" I-beam.



No. 4

Manufactured by

THE MOTCH & MERRYWEATHER MACHINERY COMPANY

715 PENTON BUILDING

CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT



Shop HINTS



Turning commutators with diamond tools

by J. B. Leece,

Chief Tool Engineer

The Leece-Neville Co.

Cleveland, Ohio

While we know that large diameter commutators are being turned with diamond tools, our particular problem was concerned with turning small $\frac{3}{4}$ " diameter commutators having 11 slots and a $\frac{3}{8}$ " face. The finish had to be a mirror finish, with no chips to be left in the slots. This was a high production job; approximately 3000 in 7½ hours. We purchased two IMP high speed lathes, ran the spindle at 3500 r.p.m. and started using carbide tools. Our feed was, and is now, .002" per revolution. We averaged 200 commutators with the carbide tools with a depth of cut of .020". We often pulled the bars out, so we used two lathes, roughing .012" on one and finishing .008" on the other. However, the cost of this was out of line as we had to have a man sharpen the tools and he was hard put to keep up with production.

Knowing that large commutators were being turned with diamond tools we decided to try them on our small commutators. Unfortunately, the ideas of the industrial diamond engineer, whom we called in, didn't pan out, and

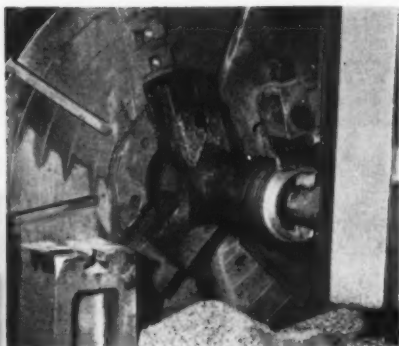
we found ourselves in a worse state than we had been with the carbides.

Nonetheless, we contacted another industrial diamond engineer who was willing to experiment with our ideas. By changing the shape of the tool, experimenting with holders, we finally arrived at a satisfactory solution.

We are now getting from a minimum of 10,000 commutators to a maximum of 40,000 on one diamond turning tool. Also we are able to remove the .020" in one cut. These tools cost us \$18.00 a piece, and can be lapped approximately six times at \$3.50 per lap. These figures will indicate the savings of diamond tools over carbides on this particular installation.

Carbide tools turn and bore large sleeve simultaneously

Here is a simple but ingenious setup where virtually standard carbide tools cut costs and increased output considerably. Two operations, turning and boring, are done simultaneously to ma-



chine both inside and outside of the sleeve shown in the photo.

The part, a liner, is made of extremely close-grained centrifugal cast iron.

Tools use standard Carboloy blanks, grade 44A. A speed of 140 sfm at a feed of .018" is used for the $\frac{1}{4}$ " roughing cuts and 189 sfm at .020" feed for the .015" to .030" finishing cuts.

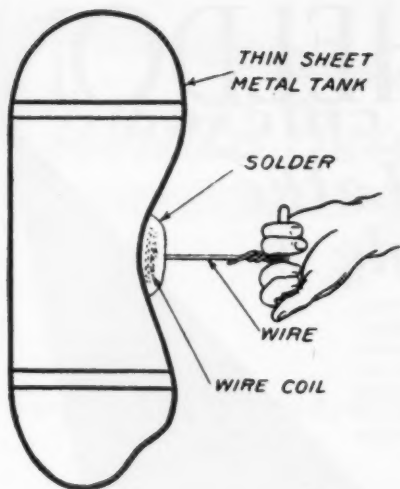
Since tool life is extremely long, tool cost on this highly-productive setup is also very low.

How to straighten dented or collapsed sheet metal tanks

This sketch shows a method that has been used successfully in straightening thin dented or collapsed tanks. If a straightening rod can be used from the inside for reaching the dented spots, or if it is practicable to apply internal water or other pressure for forcing out the dents, this "soldering method" is not recommended. But there sometimes



"That's the boss' son—he wants to start learning the business at an early age."



is no other method.

Make a coil on the end of a wire similar to that sketched and solder it onto the tank at the dented place. When attached, pull with one hand and simultaneously pound around the out-

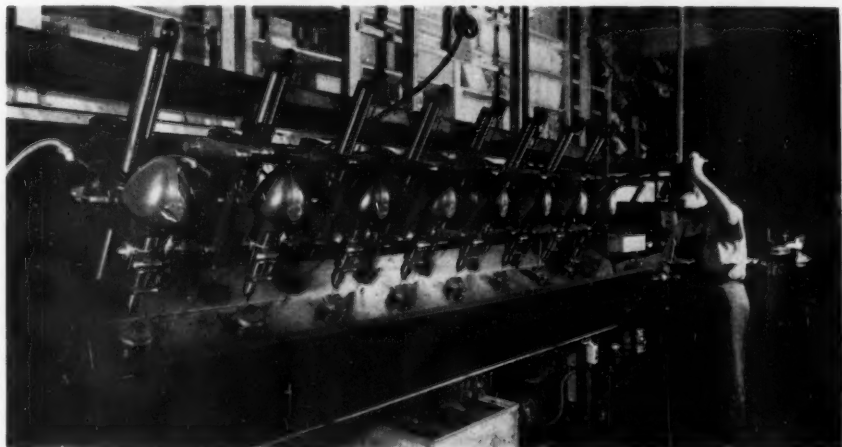
side of the dent with a rawhide or "soft" hammer with the other hand. The dent will usually come out without any difficulty. After straightening, the solder is easily melted off and the same process is quickly shifted to the next dent, if there is another. If the metal cannot be soldered and if you have a welding set, the welding process is similarly applicable.

Tilted table gives better lubricant flow

The gang-operated drill press set-up shown in the accompanying photo was designed by the Atlantic Service Co., Brooklyn, N. Y. The eight Delta 14" Drill Presses are mounted on a sectional table which is tilted forward to make it easier to clean and to get better lubricant flow.

All spindles are connected to a master shaft, thus move simultaneously. The part being drilled is held on a jig which can be moved lengthwise and across. In this set-up as many as one hundred holes are drilled in each piece.

By tilting these drill presses . . . cleaning is made easier.



SHELDON

CHICAGO

A better Lathe from any angle

Judge it from any angle: for accuracy, stamina, rigidity or capacity (for size). Check its component parts—its spindle, spindle bearings, lead screw, apron, carriage, bed, gearing, or the power delivered by its drive—you will find the SHELDON Lathe a quality tool both in appearance and "under the hood".



Write for
Catalog

SHELDON MACHINE CO., Inc., 4242 North Knox Ave., Chicago 41, Ill.

What's New

IN

METALWORKING

Govro-Nelson model "KT" tapping unit

A rugged and dependable automatic tapping unit, designated as the Model "KT" has recently been introduced by The Govro-Nelson Co., 1933 Antoinette Ave., Detroit 8, Mich. This clutchless, centrifugal-feed operated tapping unit is completely automatic, with electrical controls. It is designed for single or multiple operation in any plane or at any angle, to operate simultaneously, in sequence, or in conjunction with other equipment from remote controls, according to the manufacturer.

Provided with an accurate tap, properly ground and aligned, this unit can produce Class 4 threads consist-

tently, without the lead screw, and hold depth to close tolerances on blind hole tapping. The adaptability of the unit is governed by the size tool which can be operated in a given material at the 1800 r.p.m. spindle speed.

Among the numerous advantages of this versatile device are its centrifugal weight design. The centrifugal mechanism runs in an oil bath. Seals at the motor and spindle retain the oil, preventing the entry of coolant. The working parts of the Model "KT" are made to aircraft precision and balance. Three-point ball bearing suspension has been incorporated for smooth operation. A machined diameter at the nose of the unit has been provided for mounting special adaptations.

The Govro-Nelson Model "KT" tapping unit

... with centrifugal feeding action, completely automatic, with electrical controls.



The motor is a General Electric $\frac{1}{4}$ h.p., 60 cycle, 3-phase, 220/440 volt (not interconnectable), 1800 r.p.m. reversing type, totally enclosed with an exterior cooling fan.

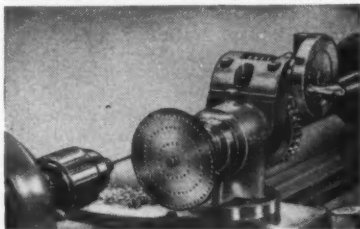
The Model "KT" is further provided with a positive clamping tool holder, to prevent run-out caused by floating holders. The tap idles in reverse but runs clock-wise before moving toward the work, preventing the stripping of the first thread; this eliminates the chamfering caused by some devices.

Jig Boring on Lathes!

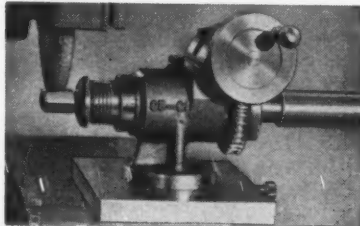


Handles work in the horizontal plane at any angle to lathe spindle.

You can now do jig boring with this revolutionary vertical rotary attachment—the DU-ONA-LATHE. Ordinarily possible only with jig borer. Accurate to the 1/10th of 1°. Performs many jobs—drilling, reaming, flycutter facing and jig fixture work. Excellent as surface grinder to form triangles, hexagons or odd shaped punches and tools. Fits all 9" and 10" lathes.



Drilling accurately spaced hole patterns on a lathe.



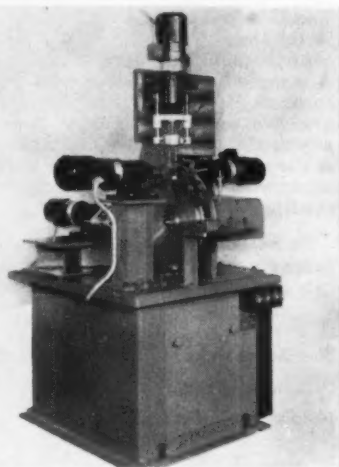
Grinding hexagon punch from round bar stock on surface grinder.

Send Today for Free Illustrated Folder

ALLAN MANUFACTURING CO.
22-78 Steinway St., Dept. B11, L.I.C. 5, N.Y.

The unit has a maximum stroke of 1 1/4", a maximum standard collet capacity of 1/4". Its tapping capacity is 0-80 to 3/8"-16, depending upon the material and depth of tap. The standard assembly is for right-hand threads. By reversing one part and changing the wiring leads, the unit will operate equally well on left hand threads. This versatile unit is not a single purpose machine, but may be used with any tap size within its range.

Four tapping heads, . . . two with two spindle heads, electrically interlocked with Govro-Nelson Geneva indexing dial mounted vertically to tap 2, 4, or 6 holes in a variety of switch box parts at a rate of 2200 parts per hour.



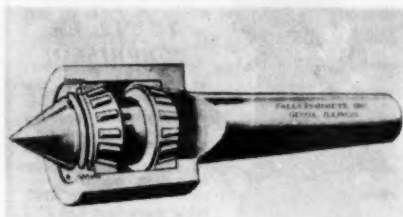
There are manifold applications of the Govro-Nelson drilling and tapping units. The picture above shows four tapping units mounted to tap holes in switch box parts. Drilling units may also be wired to operate simultaneously from a momentary contact foot switch to drill and countersink holes in bushings or small mechanical parts.

The Roto Center for lathe and grinder tailstocks

A useful device which has been designed for use on lathe and grinder tailstocks is the Roto Center, recently developed by Falls Products, Inc., Genoa, Ill. The design of this unit incorporates two matched tapered roller bearings. The precision construction allows the tailstock center point to rotate with the work, and still retain "dead-center" accuracy and rigidity. Coarse feeds and high speeds of modern lathes and grinders are now possible with positive elimination of center spoilage, according to Falls Products, Inc.

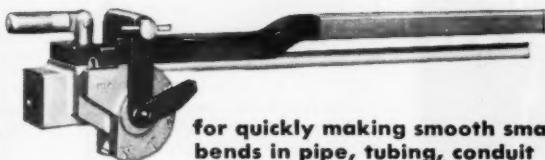
The bearings are preloaded for absolute rigidity and spindle alignment. The spindle run-out of the Roto Center is guaranteed to .0002" total indicator reading. The usual constant regreasing at the center point and careful re-adjusting of tailstock pressure are no longer necessary with the Roto Center, it is stated.

The shank of the Roto Center is made from high quality steel, induction hardened for maximum strength and wear resistance and precision ground for perfect fit. The spindle is made of selected alloy steel, hardened to Rockwell C64, with the point ground in its own bearings after assembly. The



bearings can be easily adjusted for take-up and wear; the short spindle mounted in its heavy duty housing prevents the spindle from buckling under heavy load conditions; only perfectly matched roller bearings are used, insuring maximum life and accuracy.

GREENLEE HAND BENDER



for quickly making smooth small-radius bends in pipe, tubing, conduit

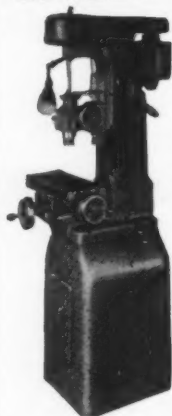
Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



GET FREE FOLDER E-207 AND BOOKLET E-201. Complete facts and prices on the Greenlee Bender line. Write Greenlee Tool Company, 2011 Herbert Avenue, Rockford, Illinois.



**FOR SMALL
JIG BORING
PUT SMALL JOBS ON THIS
LINLEY MACHINE**



and save your larger machines for heavier work.

**YOU'LL BE
SURPRISED!**

at the extremely low first cost and the vitally important jobs that this little precision machine can do. It will pay you to get our accuracy information on this machine which has 6"x10" table movement and 7" x 17 1/2" table size.

Write TODAY For
Full Information

**LINLEY BROS.
COMPANY**

663 State St. Ext.
Bridgeport 1, Conn.

**Micro
Supreme
LAY-OUT AND
IDENTIFICATION DYE**

13 COLORS

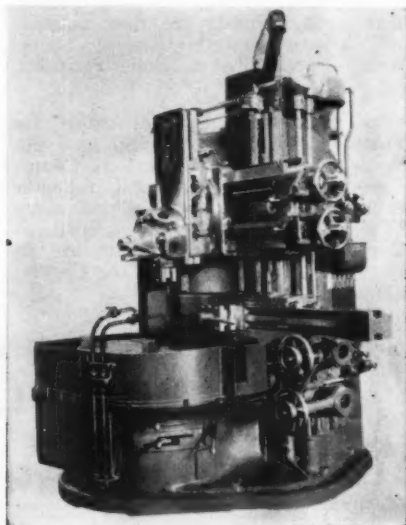
For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

**MICHIGAN CHROME &
CHEMICAL COMPANY**

6340 E. Jefferson Ave. • Detroit 7, Mich.

42" vertical boring mill

A new Niles 42" vertical boring and turning mill with side head is announced by Baldwin-Lima-Hamilton Corporation, Hamilton, Ohio. The machine, best known as the "Niles Side Head Mill," has been modernized by increased table speeds and corresponding feed changes; by use of anti-friction bearings in the table speed change gear box and table mounting; and by a higher powered drive from a 30 h.p. motor.



The machine combines the advantages of turret lathe, engine lathe, and vertical boring and turning mill, with independent or simultaneous engagement of down and cross feed or power traverse for both rail head and side head. Centralized and simplified controls for multiple tooling make it adaptable to job shop or quantity production.

High accuracy is provided by several design features, including an integrally cast column and base, which give high rigidity, a three-track cross-rail, assuring perfect alignment between the cross-rail and the table in all positions of the rail, and an elevating screw adjacent to the narrow guide, which prevents tilting and binding.

A center stop which accurately locates the rail head and maintains perfect alignment between it and the center line of the table spindle is an important feature essential for accurate boring with double head cutters, for drilling and reaming.

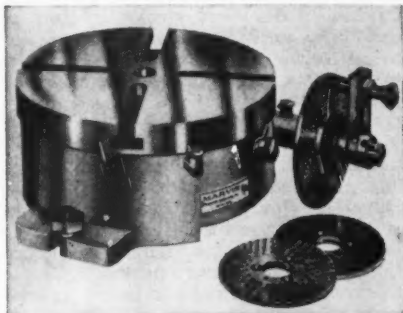
The actual swing with the side head down is 50". Maximum distance from table top to turret face is 48". The vertical head, which has five faces, has a slide travel of 28" and will swivel 45° to either side of vertical position. The side head, which has four faces, has a vertical working travel of 35" and a horizontal travel of 21".

There are twelve table speeds ranging from 9 to 200 r.p.m. and 16 feeds for either vertical or side head between .003" and 0.520" per revolution of the table. The machine occupies a floor space 8 ft. 4 in. wide by 8 ft. 10 in. deep and stands 10½ ft. high.

Marvin rotary table

Marvin Machine Products, Inc., 414 Ford Bldg., Detroit 26, Mich., has introduced a rotary table specifically adapted for defense work. The Marvin Rotary Table is extremely rigid, especially proportioned for bench mill, shaper, or drill press. The table is furnished with three index plates, each of which has six circles of holes, which give a wide range of divisions. It locks from the center giving assurance against tilting.

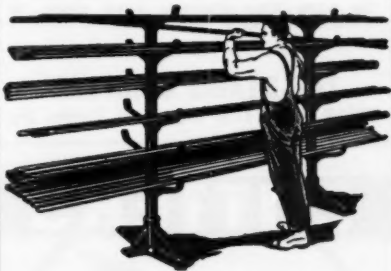
The Marvin Rotary Table is provided



with a large cast iron worm wheel, with hardened and ground worm (40:1 ratio), which can be disengaged. The table has a diameter of 6¼".

SPEEDS UP STOCK-ROOM SERVICE

The BROWN TIME-SAVING RACK saves the time previously lost end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time, and returned to their production machines to turn out a maximum of output.



Any time you require additional storage space, all you need do is add more units. If you want to relocate it at any time, you can do so quickly for it is unattached to the building. It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist; depreciation is practically nil.

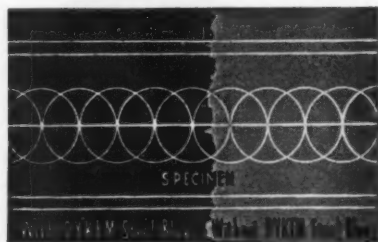
SEND FOR BULLETIN No. 26-M DESCRIBING—

BROWN'S *QUICK-SERVE* RACKS

BROWN ENGINEERING CO.

126 N. THIRD ST. READING, PA.

RACKS • VISES • CLUTCHES • COUPLINGS



DYKEM STEEL BLUE STOPS LOSSES making dies & templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY

2301Q North 11th St., St. Louis, Mo.

CUTTERS



**FLAT BARS • RODS • ANGLES
WIRE ROPE**

Hand Operated Three sizes

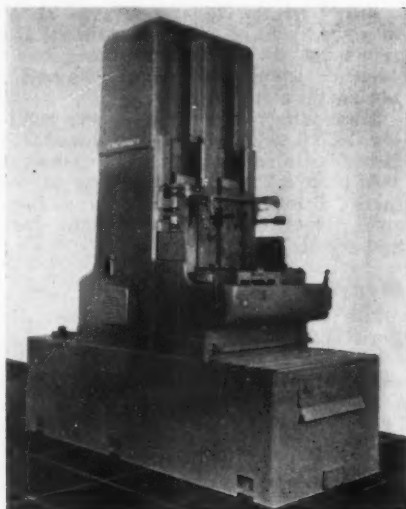
SEND FOR CATALOG SHEETS

T. H. LEWTHWAITE MACHINE CO.

312 East 47th Street New York 17, N. Y.

Cincinnati Duplex vertical Hydro-Broach machines

An improved Duplex (double ram) Vertical Hydro-Broach Machine has recently been announced by The Cincinnati Milling Machine Co., Cincinnati 9, O. These machines are currently built in 5 and 10 ton sizes (broaching force), 42" or 54", and 54" or 66" stroke, respectively.



The table construction of the Duplex is a principal design improvement. The rams operate alternately up and down, cutting on the down stroke. In front of each ram, an individual table advances to cutting position and retracts to the loading position, synchronized with the movement of the rams. These tables operate over long square-gibbed bearing ways, hardened and ground, and automatically lubricated. The tables and rams are actuated hydraulically. Dovetail clamping strips, located in accurately machined slots, clamp the fixture to the table, which is exceptionally heavy, and provides ample thickness for drilling and tapping screw holes, if required.

Protection of the hydraulic pump valves is provided through mesh intake strainers and a filter connected in parallel to the hydraulic circuit. When

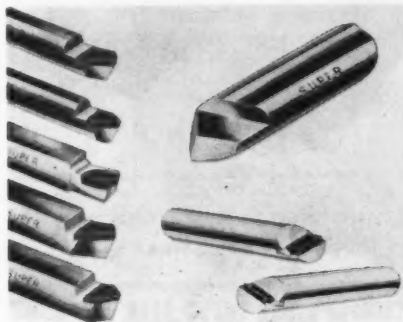
the pressure on the filter increases to a pre-determined value, a pressure gage, visible from the operator's working position, serves as an indication that the filter is becoming clogged and should be replaced.

Preset Cycle Control, a safety feature formerly supplied as an attachment, is now included as standard equipment. This unit is an electrical push button box extending from the front of the machine. With it, the operator can initiate the starting of the next cycle for either ram, if he has unloaded and loaded the corresponding fixture while the ram is returning. If he has not completed this duty, the ram automatically stops at the top of the stroke, and does not descend until the operator elects to touch the present buttons. Two hands are required; both are out of the way of moving cutting tools.

Super carbide boring tools

With the recent addition of solid carbide standard boring tools to the line, Super Tool Company, 21650 Hoover Road, Detroit 13, Mich., now offers a total of nine types of standard carbide boring tools.

According to M. J. Steffes, sales manager, these standard tools are available from stock in all the carbide grades listed in Super's new Catalog No. 50, and can be produced in other



suitable grades upon request. There is a standard type to fit each of the more popular boring machines as per the above illustration.

**Send for
FREE SAMPLE!**



**TRY THIS DIXON
LATHE CENTER LUBE**

**See for yourself
... at no cost
... how superior it is!**

*Stops wear, scorching,
burning, breakdown*

• Do you use white lead or ordinary grease to lubricate lathe dead centers? If so, do this . . . write for a trial tube of Dixon Lathe Center Graphite Lubricant.

We'll send you a handy tube of Dixon Lube **ABSOLUTELY FREE**. Once you try it, we are certain you'll swear by it forever!

Remember, this is no ordinary lubricant. It's special throughout . . . combines Dixon *Natural Graphite* and special lubricating compounds to provide *great film strength*. That's why it withstands terrific pressure and friction!

ALL YOU NEED DO is write to us (letter or post card), requesting free sample. Just give your name and position, and your company's name and address. Joseph Dixon Crucible Company, Jersey City 3, N. J.

DIXON
Graphite
LATHE CENTER LUBE

Sold through Distributors



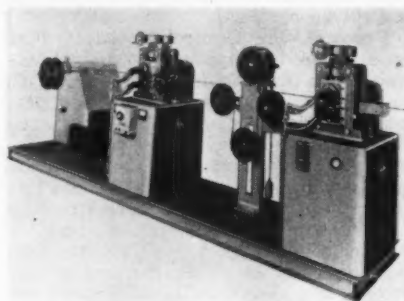
High speed wire rolling mill

The Stanat Manufacturing Co., 47-28 37th St., Long Island City 1, N. Y., has just introduced a high speed, two-stand wire rolling mill (Model T-400), designed for flattening round and other types of wire. The roll size is 6" diameter x 4" face width.

This two-stand rolling mill features a simplicity of design which makes it easy to set up for either short or production runs. The mill operates on a variable voltage principle. The two mill motors receive their power from a single generator, operating from an a.c. source. The generator, with all necessary controls, is housed in a single compact unit. Synchronization of both motors is accomplished by a dancer roll rheostat.

The housing of the rolling mill are made of Meehanite metal and are extremely rugged, according to the manufacturers. The rolls are water cooled and run on full length roller bearings with separate thrust bearings. Rolls are adjusted by means of hardened and

ground feed screws, which connect to the single hand wheel through worm gearings. A simple compensating device adjusts for roll parallelism.



Edging rolls run a tapered roller bearing, and are provided with a quick release handle for easy threading of the wire. Roll replacement is made quickly and easily. Several types of recoilers are available, depending upon specific requirements. The Model T-400 occupies a floor space of approximately 5' x 15'.

Anderson

PILLOW BLOCK BALANCING WAYS

Especially suited for large diameter work, as a sub-base can be made of proper height to give necessary clearance for work. Anderson Pillow Block Balancing Ways are precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings. Many manufacturers have endorsed them for profitable, efficient, static balancing.



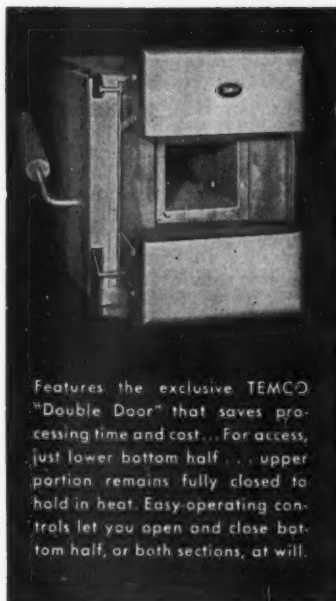
**Built in 1,000, 2,000, 5,000, 10,000
and 20,000 Capacities**

Write for Bulletin 11-5

ANDERSON BROS. MFG. CO., Rockford, Ill.

Balancing Ways, Roto Checkers, Hand and Power Scrapers,
Spotters, Hand and Power Hydraulic Straightening Presses





Features the exclusive TEMCO "Double Door" that saves processing time and cost... For access, just lower bottom half... upper portion remains fully closed to hold in heat. Easy operating controls let you open and close bottom half, or both sections, at will.

TEMCO

SERIES 1700 ELECTRIC FURNACE

FOR HEAT-TREATING TOOLS, DIES, PARTS

A husky furnace for heavy duty service. Range 350° to 1900° F. Welded steel body with 6" dual insulation. Embedded type elements in four sides of chamber. Operates on 230 V., 1 ph. Available without controls or with two types of control instrument: (1) Temcometer stepless temperature controller and indicator or (2) electronic pre-setting type controller pyrometer.

Model	Chamber W" H" D"	Furnace Only	With	With
			Temcometer Controller	Electronic Controller
1730	9½x8½x13½	\$235.00	\$297.50	\$450.00
1740	9½x8½x18	285.00	347.50	500.00

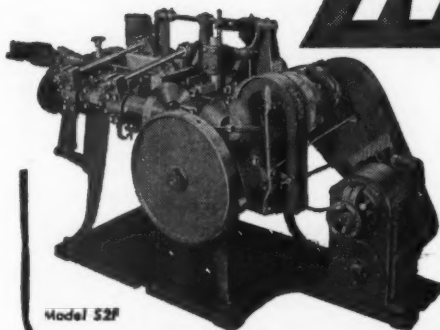
Write for complete data and dealer's name.

THERMO ELECTRIC MANUFACTURING CO.

486 Huff St., Dubuque, Iowa

TRULY—THERE'S

NILSON



Model 52F

**For Rapid,
Accurate, Automatic Production**

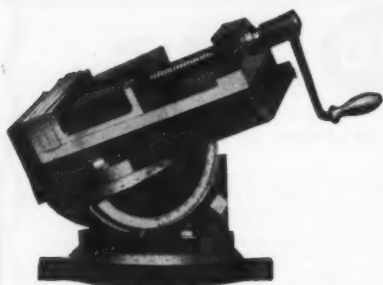
• Combination Press and 4-Slide Forming Machine

Extra rigid construction; tooling costs are generally lower; forming tools are interchangeable and easy to adjust. Send for catalog.

A. H. NILSON MACHINE CO.
BRIDGEPORT 5, CONN.

Automatic Wire and Metal Forming Machines • Staple Forming Machines • Chain Making Machinery • Foot and Power Presses • Wire Reels • Wire Straighteners.

SPECIALISTS IN WIRE FORMING EQUIPMENT FOR OVER 50 YEARS



SAVE TIME!

on intricate, angular set-ups with the MASTER MULTI-SWIVEL VISE. Fully universal. 3 swivels. Instantly set any compound angle. Parts interchangeable. Optional accessory: Platen, interchangeable with vise. This vise used in machine shops throughout the world. Circular on request.

DONOVAN MFG. CO.
80 BATTERYMARCH ST., BOSTON, MASS.

**SAVE
YOUR
DIES**

**DURANT
Stock Oiler**



- Prolongs Life of Die
- Eliminates Hand Oiling
- Saves Production time
- Minimum COSTS
- Variety of Sizes

Write for free catalog sheet

DURANT TOOL SUPPLY CO.
155 ORANGE ST., PROVIDENCE 3, R. I.

Cosa introduces Alzmetall drills to U. S.

The Cosa Corporation, 405 Lexington Ave., New York 17, N.Y. is introducing in the United States, the Alzmetall Line of High Powered Upright Precision Drills. These machines are made in three sizes. The drilling capacities for cast iron range between 15/16" and 2-5/16"; capacities for steel are from 13/16" to 2". The smallest machine has a No. 3 Morse Taper Spindle and the two larger types have spindles with No. 4 Morse Taper. Infinitely variable speed drives, depending on the size of the machine, range from 105/1450, 90/900 and 40/800 r.p.m.

For better illumination of the work piece, all machines have a light mounted on the underside of the head.

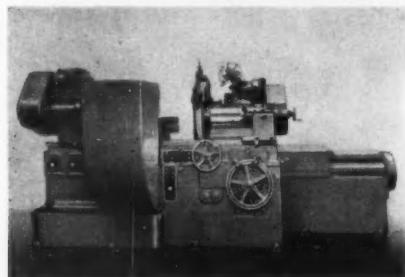


The two larger type drills are equipped with adjustable, automatic depth releases and can also be provided with coolant and tapping attachments. The above illustration shows an Alzmetall Model AB 5/S Precision Drill

with No. 4 Morse Taper Spindle. This unit has infinitely variable speeds from 40 to 800 r.p.m. and three feeds of 0.04", 0.08" and 0.12" per revolution. The machine is equipped with a 4.2 h.p. motor. The weight is 3304 lbs.

Norton aircraft strut grinder

A new aircraft strut grinder, built especially for grinding the components of landing gear mechanisms used on



large planes, is introduced by Norton Company, Worcester 6, Mass.

This machine provides the capacities required for grinding mechanisms which, because of their irregular shape and large swing, are not accommodated in standard sizes of cylindrical grinders. It is arranged for a 26" or 32" diameter swing over the table, and is available in work length capacities of 72" and 96".

The Norton strut grinder offers a swing capacity of 80" or 86" by means of a gap. This gap is adjustable in width by moving a pedestal on which the headstock rests. Through the pedestal feature, the gap may be set to any desired width up to 26½" and is provided with a safety guard adjustable for width.

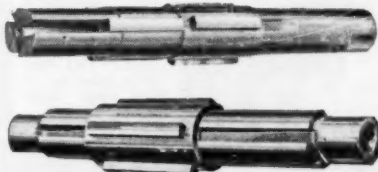
The machine is of the traveling wheel head type. A convenient means of wheel head travel control is provided by adjustable dogs on a large wheel placed on the front of the machine. A swivel table permits grinding of tapers. The rugged wheel spindle unit and the ample proportions of the entire machine assure highly dependable service, the manufacturers state.

Nicholson Expanding Mandrels

SAVE TIME LOST Providing Solid Arbors

Records in many shops show Nicholson expanding mandrels actually get operations completed in less time than was formerly consumed in providing solid arbors. In cases this results in a tremendous cut in "down" time. Set of 14 Nicholson mandrels replaces

209 solid arbors; for all bores ½" to 7". Sold singly or in sets.

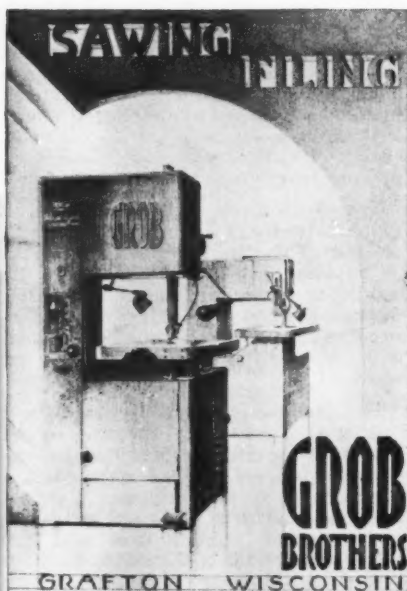


W. H. NICHOLSON & CO.

117 Oregon St., Wilkes-Barre, Pa.

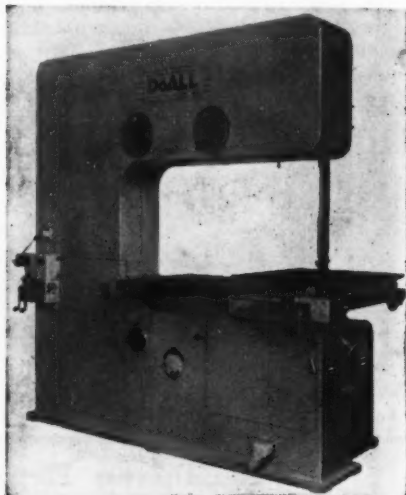
BULLETIN 750 shows how these widely used tools save time and promote precision.

Steam & Air Traps • Control Valves • Expanding Mandrels • Arbor Presses • Welded Flats



DoAll vertical bandsawing machine

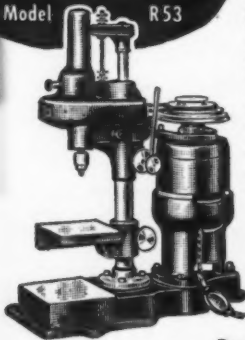
This large work capacity, extended speed range bandsawing machine illustrated below is introduced by The DoAll Company, Des Plaines, Ill. The unit's flexibility enables it to meet the specific requirements of any band machining problem.



Sensitive, Precise, Accurate

HIGH-SPEED Drilling Machine

Model R53



An accurate precision drill of highest quality sturdily built—and so sensitive that operator actually "feels" its progress and avoids many small drill breakages.

Built for ANY precision drilling from No. 80 to 1/4 inch. Spindle travel 2 1/4 inches. Speed range 750 to 6,000. Accurate adjustable depth gauges. Bench or pedestal type. Write today for full data and literature.

HIGH SPEED
Hammer Co.,
Inc.

311 Norton St.
Rochester 21, N.Y.

Standard drive and feed components are combined in the 60" throat frame to provide maximum machining versatility. The welding unit joins and anneals all band widths up to 2". It includes a motorized grinder and blade squaring shear.

The job selector dials cover the blade, speed and feed recommendations for all types of materials over the machine's tool speed range of from 40 to 10,000 feet per minute. This speed range is handwheel controlled through a three-speed transmission and variable pitch diameter Speedmaster drive.

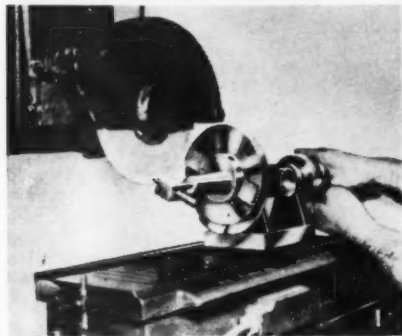
For straight power feeding to assure straight vertical cuts, the 16" stroke hydraulically powered work table is used. The table tilts 45° right and 10° left for angular cuts and beveling operations. An hydraulic pressure system is built in, and feed is regulated by a convenient control at the front of the table.

The machine is powered by a $7\frac{1}{2}$ h.p. motor and its wide variable speed range makes it possible to cut any type of material. At conventional metal cutting rates it will saw or file tool steel, large forgings and castings or structurals for weldments. At high speeds it will cut or polish non-metallics, composition materials, laminated products and non-ferrous substances. At top speed it will friction cut stainless and heat resistant alloys, sheet metal, galvanized corrugated sheathing, building panels, etc.

These vertical bandsawing machines are available with set or variable speed, with throat capacity ranging from 16" to 60" and using from 2 to 10 h.p. motors.

Last Word unit dresses wheels from bottom

The Last Word Wheel Dresser is a compact, rugged and precision built unit, recently announced by Last Word Sales Co., 18500 Mt. Elliott Ave., Detroit 34, Mich. This tool when mounted on a magnetic chuck, can accurately dress any radius, concave, or convex, with angles tangent to radius. It likewise can be used for plain radius or angle dressing or any combination.



The set-up of the diamond head is rapid and simple. Angle stops are incorporated for accurate control of relationship of radius and tangent. Two important additional advantages of the Last Word Dresser are, that it does not require center mounted diamonds and that it permits dressing below the wheel for use of guards and dust collector.

SHOPLIFTER



... let an Economy SHOP-LIFTER do the heavy work around here.



Every shop needs a SHOPLIFTER. Saves men, saves materials. Besides handling heavy dies, the SHOP-LIFTER can stack drums and boxes, unload street trucks, pick up skids and be used as an adjustable height table.

All steel, arc welded frame. Easily operated hoist unit with automatic brake, safely holds load at any height.

500 pound capacity	
Type D, hand operated.....	\$254.00
1000 pound capacity	
Type DX, hand operated.....	\$490.00
2000 pound capacity	
Type DX, hand operated.....	\$590.00
Floor lock to hold machine steady:	
\$16.00 extra for 500 pound sizes;	
\$24.00 extra for type DX models.	

List prices, F.O.B. Chicago, subject to current discount

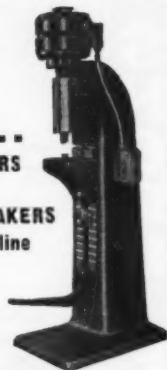
ECONOMY ENGINEERING COMPANY

4505 W. LAKE STREET • CHICAGO 24, ILL.

GRANT

RIVETERS...

**PIONEERS
and
PACEMAKERS
in their line**



—head rivets from smallest to 1/2" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles.

Write for literature and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
C E Station, Bridgeport 5, Conn.

"Get them from Gillen"



**TAPER PINS
MACHINE KEYS
SPECIAL MACHINE PARTS
WOODRUFF KEYS
GROOVE PINS**

Write for Catalog
and Prices

John Gillen Company

INC. 2542 SOUTH 50th AVENUE • CICERO 50, ILLINOIS

16" Hercules high speed shaper

The 16" Hercules high speed precision shaper is now being offered in the United States by Parker Machine Co., Inc., 158 Pioneer St., Brooklyn 31, N. Y. These Tool Room and Production Shapers are high speed machines, built especially to meet modern demands and the requirements for any tool and die work or general work. They have great rigidity, compactness and power to assure lasting performance.



The heavy column is bolted to the base, which is heavily ribbed in order to withstand deflections when taking heavy roughing cuts, and to meet the demands of surface quality and accuracy. The ram and vee-ways are hand scraped. The alignment of the ram is uniformly maintained throughout the entire length of the guideway. Normal play is eliminated by the adjustable gib controlled by a single screw. The vee-guides are automatically lubricated.

The swivelling toolhead is located at the operator's side of the machine, and graduations indicate the angular position throughout 90°. An adjustable dial, graduated to read in .001", facilitates setting the tool.

Six speeds are provided, ranging from 24 to 152 r.p.m. A cutting speed indicator is standard equipment. The 16" Hercules shaper is automatically lubricated through a built-in Sundstrand

pressure type pump. An Auto-clean Filter measures freedom from foreign matter of the lubricating oil.

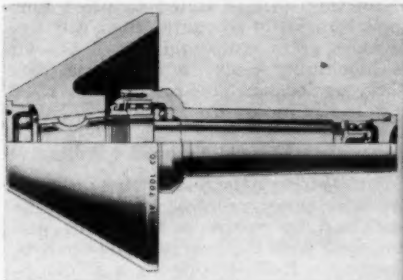
The table, measuring $15\frac{1}{2}$ "x $10\frac{1}{2}$ " is provided with three T-slots; horizontal table travel, either automatic or manual is $13\frac{3}{4}$ "; vertical travel is also $13\frac{3}{4}$ ". Maximum distance, table to ram is 16"; minimum distance is 2". The table is firmly fitted to the saddle, and its position is permanently insured by a square key. A table support is provided, sliding on a wide, planed and hand-scraped guide way.

Ready multi-purpose center

Ready Tool Company, 550-B Iranistan Ave., Bridgeport, Conn., has come up with a multi-use center that is stated to ease the concern of center users who are finding it progressively more difficult to get supplies in these days of critical shortages. The new tool is a bull nose, replaceable point center, so designed that the bull point can be removed quickly and another bull point inserted to accommodate the work,

without having to remove the center on the machine.

A center of this type is more suited for the heavier type of work on tubing or pieces with large center holes; it performs at top efficiency on engine lathes, turret lathes or grinding machines. The center's roller bearing de-



sign assures accuracy, providing maximum radial and thrust load capacities. The new Red-E-Superaccurate multi-purpose centers are available in any required shank, taper or head size.





"...it's the bushing that makes the wHOLE difference"

To maintain maximum accuracy in drilling operations, use the bushing that's precision made for the job . . . use Acme! Write for catalog.

Acme Industrial Company

Makers of Hardened and Ground Precision Parts
210 N. Laflin Street • Chicago 7, Illinois

THE SERVICE SHOP TO INDUSTRY FOR MORE THAN 25 YEARS

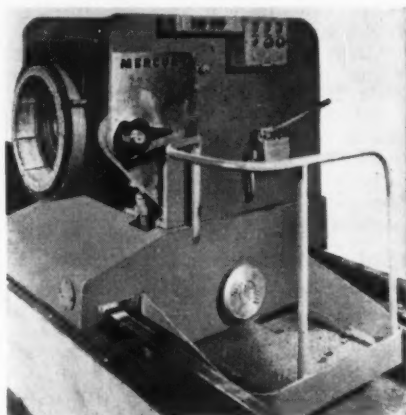
Mercury traveling head grinder

A new approach to the problem of face grinding is offered in the Mercury Series E-20 Traveling Head Grinder, designed and built by Mercury Engineering Corporation, 2100 N. Farwell Ave., Milwaukee 2, Wis.

Designed for the grinding of armor plate, this unit is stated to offer new opportunities in grinding edges, angular surfaces, compounds and bevels, as well as machining pads on heavy castings 20 ft. or longer. The new Series E-20 design eliminates the costly and hard-to-maintain traverse bed common to conventional traveling head grinders.

The Mercury grinder runs on self-powered precision rollers along rails machined to precision tolerances and equipped with built-in leveling devices. The Series E-20, employing a 20" face-type grinding wheel mounted on a head which tilts from horizontal to full vertical, has complete mobility with the traverse rate continuously variable. Two or more grinders can operate simultaneously on a single set of rails.

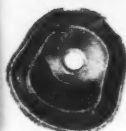
These rails, mounted on a concrete base, are kept clean by means of an efficient wiper system.



Super-powered for continuous production, the 20 h.p. motor and heavy duty precision spindle assembly are mounted within rigid trunnions, and

EISLER CAM

JIG BORING • MILLING



A SPECIALIZED
ROWBOTTOM CAM
MILLING SERVICE...
JIG BORING... SPOT
WELDING... CON-
TRACT PRODUCTION
... EXPERIMENTAL
DEVELOPMENT



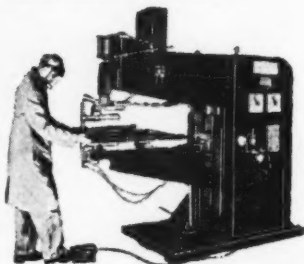
• Consultation without any obligation on your part is cordially invited

EISLER ENGINEERING CO., INC.
762 South 13th St., (Near Avon Ave.)

RESISTANCE WELDERS

SPOT • BUTT • GUN • SEAM

For all types of welding in sizes: $\frac{1}{4}$ to 300 KVA. Foot, air or motor operated.



We invite contract spot or butt welding in large or small quantities.

Chas. Eisler, Pres.
Newark 3, N. J.

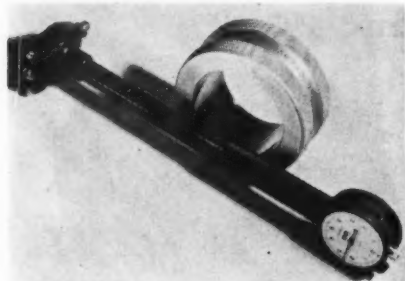
arranged to feed in and out through a 7" range, utilizing a planetary gear driven motor reducer in combination with a precision lead screw. Various increments of feed are accomplished electrically.

A full range of heavy duty grinders is now in construction, powered up to 40 h.p. with geared head drive and employing 30" grinding wheels.

Boice dial bore gage

An improved dial bore gage, engineered and manufactured by experts in the field of gage making, is announced by Boice Manufacturing Co., Route 9, Staatsburg, N. Y. This new product is stated to be both shockproof and jam-proof; furthermore it is designed with smooth, positive equalization, the manufacturers state.

The gaging pin moves the gaging plunger away from the indicator, thereby protecting the indicator from sudden surges caused by accidentally bumping the pin against the work being tested. If the gage is carelessly forced into a hole smaller than its setting, there is no possibility of its jamming and damaging the indicator.



Equalization is accomplished by a new type of centralizer with the equalizing pins fixed solidly in the head, and the entire head moving on a single shaft, thereby eliminating any possible binds, or error of centralization.

Because of the advantages enumerated, it is possible for an inexperienced inspector or machine operator to maintain the same accuracy of inspection as a skilled operator would accomplish with the same device.

November, 1951

SPECIFY KASSON PRECISION COLLETS AND ATTACHMENTS

IMMEDIATE DELIVERY FROM STOCK



FOR ATLAS • LOGAN • SOUTH BEND CRAFTSMAN • SHELDON LATHES, ETC.



KASSON

Precision

KASSON Precision products are guaranteed unconditionally for accuracy, fit and long life. Your dealer should have them . . . Write us for literature!

GENERAL DIE AND STAMPING CO.

Integrity Since 1919

264 MOTT STREET • NEW YORK 12, N. Y.

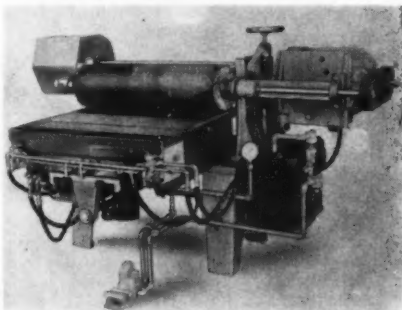
Clair surface finishing machine

A surface finishing machine capable of holding non-magnetic pieces without interference with coverage over the entire surface is introduced by Clair Manufacturing Co., 1030 S. Union Ave., Olean, N.Y. While holding magnetic products in position with a magnetic chuck is standard procedure, the Clair Model 203 Machine, with its vacuum chuck, is claimed to be the answer to the problem of holding items made of brass, copper, silver, plastic, aluminum, wood and other non-magnetic materials.

This horizontal, electro-hydraulic machine has a moving work table consisting of a perforated plate mounted over a sealed air space, this space being connected to a vacuum pump through a 4-way spring-return foot valve. Offering a maximum working area of 38" x 36", the perforated plate is covered by a rubber mat.

In operation, the table moves both "in and out" and "sideways" under the revolving buff spindle. The length of the "in and out" stroke of the vac-

uum table is adjustable from $\frac{3}{4}$ " to 36", and "sideways," $\frac{1}{2}$ " to $1\frac{3}{4}$ ". Without interfering with the vacuum action, raised pads, conforming to the contours of the parts being finished, protect the buffs from coming in contact with the mat.



The Clair Model 203 Machine may be supplied with 5, $7\frac{1}{2}$, 10 or 15 h.p. motors. Buffs up to 12" in diameter and 40" in length can be mounted on



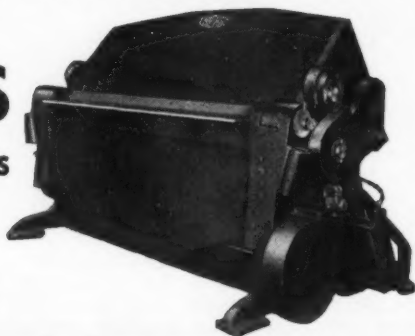
STEEL HAND and POWER

BENDING BRAKES

for Single and Quantity Runs

**BENDING STEEL PLATE
and SHEET METAL**

Special Bending Brakes
Double Folder Brakes



DREIS & KRUMP

MANUFACTURING COMPANY

7440 S. Loomis Boulevard, Chicago 36, Illinois

CHICAGO
STEEL BENDING BRAKES
BOX and PAN BRAKES
PRESS BRAKES

the spindle. This machine is available with smaller sized vacuum tables, platform type tables for mechanical holding, as well as a variety of optional modifications. It is recommended by the manufacturer for use in surface finishing non-magnetic products.

Granite surface and angle plate

A combination surface and angle plate of black granite (diabase) is announced by Rahn Granite Surface Plate Co., 641 N. Western Ave., Dayton 7, Ohio. Illustrated below is an 18" x 18" granite surface plate, attached to the squared edge of a 24" x 36" granite surface plate.

The surfaces of the two surface plates are finished by a hand lapping process to a claimed overall tolerance of .00005" on each plate. The edge of the larger plate is lapped to 90° with the top surface, so that, when the two plates are bolted together, every part of the projecting 18" x 13" is within .0002" of 90° with the plane of the larger plate.



Not only is this combination angle and surface plate accurate when made, but this accuracy will be maintained for a long time, due to the nature of the black granite, which is harder than tool steel. It has been heat treated and normalized by nature for millions of years. The granite will not rust and, should it be accidentally nicked, no burr will be raised. Neither can abrasives become embedded in this hard material.

KAUFMAN TAPPING MACHINES

Precision

Built

for

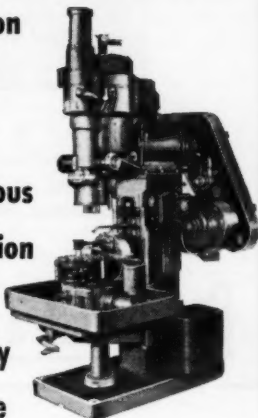
Continuous

Production

and

Hi-Duty

Service



- Fully automatic cycle.
- Lead Screw control with rapid traverse.
- Long wearing—instant reversing clutches.
- All internal moving parts run in oil bath.
- Speed changes by Selective Gearing.
- Quick changeover to handle various jobs.
- Can be used with single spindle or with multiple spindle heads.
- With or without automatic indexing fixture.

Write for Catalog 1150

KAUFMAN MFG. CO.

**551 South 29th Street
MANITOWOC, WISCONSIN**



100,000 stocked in 450 sizes for immediate delivery. Special r'd points within 48 Hrs. Order today & economize. Data sheets on request.

Ring Punch & Die Co.

108 Foote Ave., Jamestown, N. Y.

WHO The old reliable . . .
Wm. H. Ottemiller Co.,
of course.

WHAT Precision, milled-from-
the-bar Cap. Screws,
Set Screws, Milled
Studs and Coupling Bolts.

WHEN Some numbers we can
ship immediately—
others, well, you know how it is,
they'll take a little time.

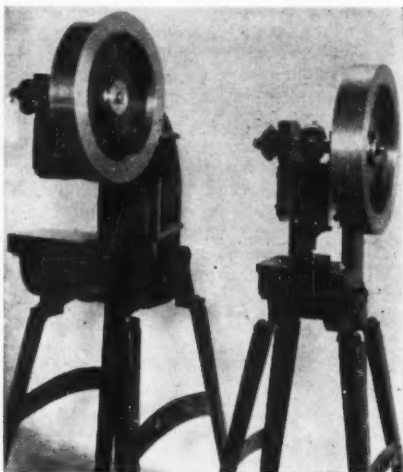
WHERE For special
jobs con-
tact us, for
catalog items see your
local Industrial Distributor.

Wm. H. Ottemiller Co.
YORK, PENNA



Kenco 5-ton punch presses

Two new 5-ton power presses, the Kenco Standard 5-ton, variable speed and the Kenco 4-in-1, 5-ton variable speed, with ram speeds suitable for deep drawing, piercing and blanking operations, have been developed by the Kenco Manufacturing Co., 5211 Anaheim-Telegraph Road, Los Angeles 22, Calif.



A massive 18" diameter, 110 lb. fly-wheel supplies the momentum needed for the slow speed operation, while ram speeds can be varied from 95 to 280 strokes per minute by adjusting the $\frac{3}{4}$ " to $2\frac{1}{2}$ " diameter of the variable speed motor pulley.

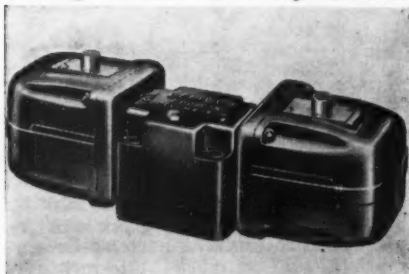
The flywheel and variable speed drive of these new presses can be interchanged with the Kenco Standard of 4-in-1, 4-ton punch presses. Shop tested and rated for 5 ton capacity, these new presses will do work which normally required back geared presses or larger capacity presses having the necessary slow ram speeds.

Other features include a one-piece, $1\frac{1}{2}$ " crankshaft, a 1" diameter clutch drive dog built into the clutch collar instead of milling the crankshaft, extra large vee-type ram guides, oversize ram area, adjustable motor bracket, an adjustable brake, facility for switching

from single to repeat operation without stopping the motor, an adjustable bed (on the 4-in-1 press) that permits conversion to a long, half, or horn type punch press, and a deep 12 $\frac{3}{4}$ " throat (4-in-1) that permits punching to the center of a 24 $\frac{1}{2}$ " circle.

Pilot valve ends spool sticking in solenoids

To overcome the problem of spool-sticking common to 4-way solenoid



valves in high pressure hydraulic circuits used for long cycling operations,

The Denison Engineering Company, 1160 Dublin Road, Columbus 16, Ohio, has developed a pilot operated valve that utilizes system pressures to move the spool. Solenoids are used only to operate small internal pilot valves.

As a result, spool action is said to be smooth, quick and positive under all operative conditions to 5000 p.s.i. The valve is also designed so that the spool always moves at the same rate of speed regardless of operating pressures.

The valve is available in $\frac{3}{4}$ " and 1 $\frac{1}{2}$ " sizes, in both single- and double-solenoid types, with provision for either external or internal pilot connections. Eight types of spools provide for eight different porting combinations. In the double solenoid unit, the spool is automatically pressure-centered when the solenoids are de-energized.

This valve is one of the most compact 4-way solenoid valves in its field, the manufacturer reports. Of further aid to simplified circuit design is the fact that the valve can be mounted in any position.

FREE TRIAL OFFER NO STRINGS ATTACHED

GRINDING and LAPPING Compounds

6 LIBERAL JARS DIFFERENT GRADES

OFFER LIMITED
to those writing on
company letterhead



A VALUABLE KIT

Carton contains 6 grades of ultra-fine quality, assorted fine grit abrasive compounds suitable for a variety of work. Coarser grit compound can also be supplied.

FOR PRECISION LAPPING

Here's a get-acquainted offer you cannot afford to miss. Among these samples will be found the answer to many a tool room lapping problem. Hard and soft abrasives for all kinds of lapping needs. Sent post paid anywhere in the U.S.A. and Canada.

No obligation—write today
on your company letterhead.

PROVE THEM AT OUR EXPENSE!

UNITED STATES PRODUCTS CO.

518 MELWOOD ST.



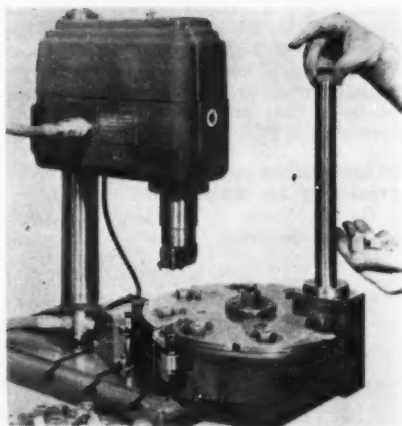
PITTSBURGH, PA.

Automatic marking machine

A new air-operated marking machine, especially adapted for light, flat marking, has been introduced by Cadillac Stamp Co., 17315 Ryan Road, Detroit 12, Mich. This ingenious device, designated as the Automark Automatic Marking Machine, will effect considerable time savings in production marking, as it has been tooled to mark as many as 15,000 parts per hour.

The illustration (right) shows a dial feed fixture adaptation for marking brass nuts at a rate of 3000 per hour. The Automark can also be readily adapted for high speed color marking by the branding method. No special jigs or fixtures are needed for average work. The machine is provided with automatic controls for high production.

The Automark machine is light in weight and can be easily moved to any place in the plant where its operation is desired. The installation is simple, and the unit operates from an ordinary 110-volt light socket. It produces up to



9000 lbs. impact pressure from a 100 lb. airline. In addition to its great accuracy and speed in marking parts, the Automark is said to mark uniformly despite variations in material thickness, holding impression depths to any desired tolerance.

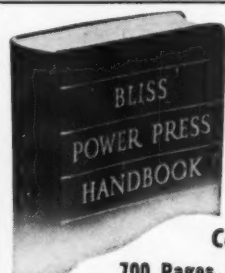


do you have a
TOOL PROBLEM

Columbus Die-Tool has been solving tooling problems for over 45 years. Expert designers and builders of all types of tools and special machinery. Write us today!

COLUMBUS DIE-TOOL
and Machine Co.

P. O. BOX 750 • COLUMBUS, OHIO



**JUST
OFF
THE
PRESS!**

Completely New
700 Pages, 450 Illustrations

Sections on:

- Easy methods of computing press jobs •
- How to select the proper type of press •
- Useful engineering tables • Die illustrations
- Glossary of terms used in the pressed metal industry.

Plus a complete service section covering all types of Bliss presses, old and new. \$7.50.

E. W. BLISS CO.

(Handbook Department)

1399 Raff Road, S.W., Canton, Ohio

Rush me a copy of the Bliss Power Press Handbook.

I am enclosing \$7.50..... Bill me.....

Sundstrand sander smooths welded seams

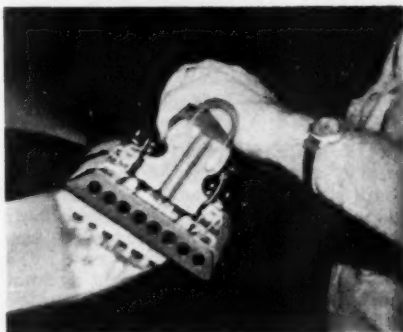
Plant welding departments are finding that the application of a new straight-line action air sander speeds the finishing of welded seams, and produces a smoother job. This machine is a recent development of Sundstrand Machine Tool Co., 2531 Eleventh St., Rockford, Ill.

Because of its straight-line action, the sander removes scratches, defects, leaves no swirls or pressure marks. The seam is grained and blended-in perfectly after assembly, a feature of primary importance in all work where an extra-smooth surface is required. Grinder marks are quickly removed and the metal is properly conditioned for painting. A good example of this is the graining and blending-in of a welded seam in stainless steel products.

Another new application in the metal working field has been developed in the aircraft industry, where sanders

are extensively used to remove burrs over rivet holes and scratches.

Included in the Sundstrand line are single-pad models for small areas, and double-pad models for speedy work on



large areas. Weights range from 5½ to 30 pounds, with speeds varying from 1,100 oscillations per minute on the heavy duty sander to over 3000 per minute on the small single-pad model.

"OPERATION MAINTENANCE" VERSUS A TROUBLE-FREE FURNACE!



FURNACE DIVISION
DELAWARE TOOL STEEL CORP.
WILMINGTON 99, DELAWARE

DELAWARE Furnaces have simplified controlled atmosphere. No scale . . . No decarburization . . . No hokus pokus. Get the facts.

Pneumatic thread-gaging tool

A new tool announced by Keller Tool Co., Grand Haven, Mich., is designed to speed inspection of the threads in tapped holes. It is air-powered, and used in conjunction with standard taper-lock gages. The operation is simple; the operator presses the tool, and the motor spins, screwing a "go" gage into the hole; the operator pulls, and the unit reverses, backing the gage out.

The Keller Thread Gaging Tool consists of a powerful air motor with friction clutch and gage adaptor, and weighs only 34 ounces. It can easily be moved to the work, and may be suspended over the work area by a balancer if desired. For inspecting small parts, the tool may be bench-mounted, either vertically or horizontally. If controlled by a foot valve, the inspector can use both hands for handling parts.

The rotary air motor turns the gage at speeds ranging up to 300 r.p.m. The speed is controlled by a built-in air regulator.



In case the threads being checked are not satisfactory, an adjustable friction type clutch permits the gage to stop without stalling the motor. It prevents the gage from jamming or being forced

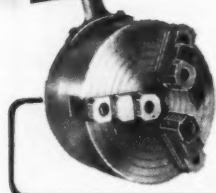


**If you want
MORE PARTS per hour
LOWER COST per part**

the BARKER WRENCHLESS CHUCK can do it faster, better and stand up to it longer. Where the run is continuous on turrets, engine lathes, cutting off machines, drill presses or any other type of chucking machine, these Chucks will increase production and pay for themselves in 60 to 90 days while

doing it. See how a Barker Wrenchless Two-Jaw or Three-Jaw Chuck can speed up production in YOUR plant.

Write for bulletin 201 today



**— Chuck Division —
THOMAS HOIST CO.**

20 S. HOYNE

CHICAGO 12

through improperly threaded holes. Friction in the clutch may be increased or decreased to accommodate for gage size and other conditions. Since the clutch is flexibly mounted, slight misalignment in placing the gage against the hole ordinarily does not cause binding.

The tool is regularly furnished with an adapter to accommodate taper-lock gages with thread diameters of from .510" to .825". Other adapters are available to handle gages ranging from .059" to 2.510" thread diameter.

Self-aligning strap-clamp

A new self-aligning strap-clamp, designed to hold work pieces securely on machine tables, face plates of lathe milling machines, boring mills, planers or punch presses and fixtures, has been introduced by Everett Sales Co., 4116 Fourth Ave., Brooklyn 32, N. Y. This useful device is provided with adjustable and self-aligning elements, enabling it to be used in connection with work pieces of a large variety of sizes and shapes.



The ball and socket arrangement indicated in the above line drawing permits the gripping members free-floating and universal movement, enabling the clamp to hold work pieces which have inclined surfaces in any direction. The ball washer on the bolt enables the bolt to stay in a vertical position. Blocking does not have to be the height of the work, since the strap will adjust itself to work height.

The self-aligning strap-clamp is made from high grade selected steel, heat treated after forging for added strength and durability. The clamp is available in two sizes, 5" and 8" (length of strap). The 5" unit will hold work pieces up to 2" without blocking or shims. With the 8" clamp, no blocking or shim is required up to 3".

November, 1951

Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding ... not only when the grinder runs idle.

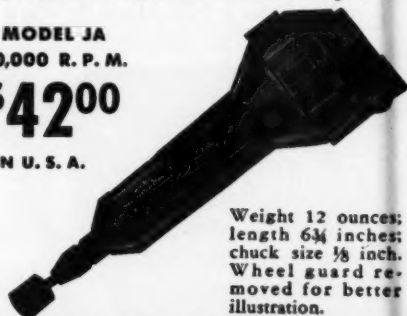
It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

Buy Kipp air tools for best results, lower prices.

MODEL JA
50,000 R. P. M.

\$42⁰⁰

IN U. S. A.



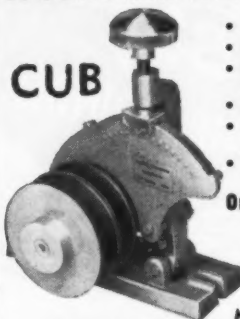
Weight 12 ounces;
length 6¾ inches;
chuck size ⅝ inch.
Wheel guard removed for better illustration.

MADISON-KIPP CORP.
207 Waubesa St., Madison, Wis., U. S. A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS

A VERY POPULAR DRIVE

CUB



- 3.3-1 Range
- For "A" belts
- Positive alignment
- Ball bearing
- Mechaned cast iron
- Ship wt. 10 lbs.

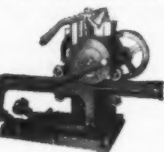
Only **\$18⁵⁰**

TODAY ORDER
(DIE CAST MODEL \$10.50)

STANDARD NO. 2 4 x 4 DRY CUT BENCH MODEL

- Lifts on return stroke
- Ball bearing guide
- Automatic cut off switch
- Angle cutting by turning saw. (Saw turns instead of work)

Price \$112.00 less meter
FOB factory.

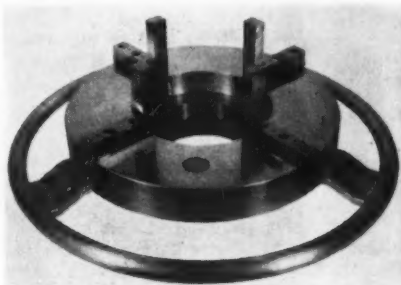


Ship. Wt. 84 lbs.

Standard Transmission Equip. Co.
70 W. UNION ST. PASADENA 1, CALIF.

Westcott chuck for use on glass working lathes

A specially designed chuck for use on glass working lathes in connection with the manufacture of television tubes has recently been developed by the Westcott Chuck Company, Oneida, N.Y. It can also be used for other work that is handled on a glass working lathe.



The new Westcott chuck is constructed with a thin body which results in a comparatively light weight chuck in relation to its diameter and holding capacity. This means minimum weight on the lathe spindle and makes it easier to handle than a standard weight chuck of comparable diameter and holding capacity.

The design of the cuttrigger type jaws is such that a 16" chuck, for example, can be made to hold a 20" diameter round bulb in the 3 jaw chuck or a 20" rectangular bulb in the 4-jaw type.

Fast and easy operation of the Chuck is made possible by attaching an aluminum hand wheel to the Chuck scroll. The scroll thread can be machined for either clockwise or counter-clockwise operation of the jaws. Special fitting tolerances are provided if the chuck is to be used under a condition of high temperature, as is sometimes the case. Adapters for attaching the special chucks to the spindles of glass working lathes are furnished on order.

Drill jig eliminates lay-out

Mathewson Machine Works, Inc., 2 Hancock St., North Quincy 71, Mass., have introduced a new adjustable drill jig which is stated to eliminate layout and cut drilling time on small lots to a

Over 85% of the torque wrenches used in industry are

STURTEVANT TORQUE WRENCHES

Read by Sight, Sound or Feel

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

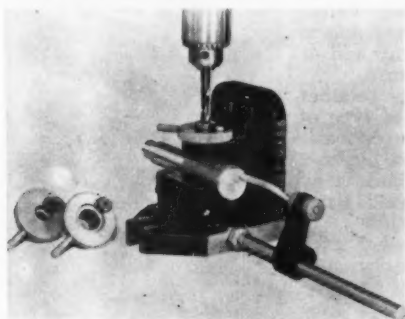
in inch ounces
... inch pounds
... foot pounds
(All sizes from
0-6000 ft. lbs.)



Every manufacturer,
design and production
man should have this valuable
data. Sent upon request.

P.A. **STURTEVANT CO.**
ADDISON QUALITY ILLINOIS

fraction, as well as eliminate the costs of special jigs for larger quantities. It is used for drilling holes through round



stock and hex stock from $\frac{1}{4}$ " to 2", and for cap screws from $\frac{1}{4}$ " to $1\frac{1}{4}$ ".

Typical operations which can be done more economically with this jig include

drilling holes for cotter pins, set screws, drive pins for bayonet joints, oil holes in tabular sections, and wiring holes in cap screws.

The hardened V-Block has two 60° vees for centering round or hexagonal stock, one for $\frac{1}{4}$ " to $2\frac{1}{32}$ " diameter, one for $2\frac{1}{32}$ " to 2" diameter. The adjustable stop for locating work longitudinally for drilling any distance from the end may be used on either side. A stop is furnished for up to 9".

Centered above the vee is an adjustable bushing carrier which holds the slip bushing, and also clamps the work securely to the block. Three of these bushing carriers are provided to accommodate slip bushings of various standard outside diameters.

Overall dimensions of the Mathewson Adjustable Drill Jig are $5\frac{1}{4}$ " high, $4\frac{1}{4}$ " wide, 7" long. All parts are in glare-eliminating crackle and satin finishes.

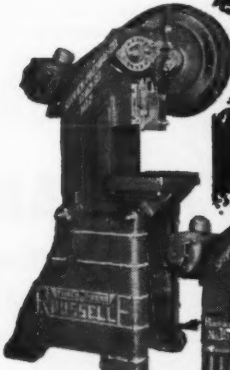
EFFICIENT — LOW COST PRODUCTION

MEANS

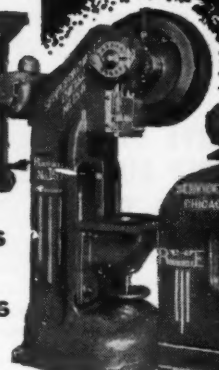
ROUSSELL

PUNCH
PRESSES


WRITE FOR
DETAILS



O.B.I. PRESS



HORN PRESS



DEEP THROAT

SERVICE MACHINE COMPANY

**7627-33
S. Ashland Ave.
Chicago 20**

Cam and pilot controlled air valve

Mechanical Air Controls, 15311 West 11-Mile Road Royal Oak, Mich., announce the addition of the Cam Operated and Air Pilot Pressure Operated Valves to their line. These two new types are available in the $\frac{3}{8}$ " and $\frac{1}{2}$ " sizes for straightway, 3-way and 4-way applications up to 150 p.s.i. air pressure.

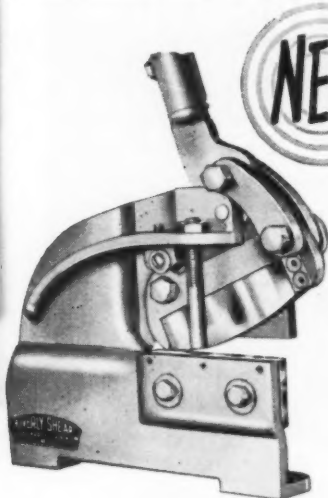
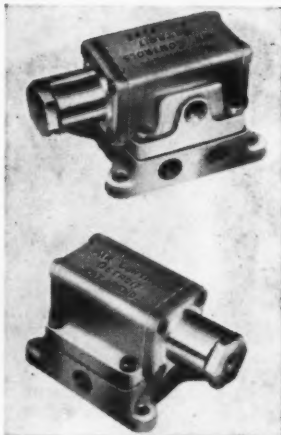
Featured is the interchangeability of the retainer or end-cap construction for the selection of type of control. Removal of four cap screws from a basic valve assembly allows a choice of operation by cam, pilot pressure, foot, solenoid, or hand. The basic body assembly remains the same, as all control mechanisms are in an integral part of the cap construction.

The valves have bronze bodies and retainer caps with bores that are lapped to a micro finish and then hard chromed. "Mac" special "O" ring type seals mounted on an aluminum alloy piston give instantaneous positive seal when they come in contact with their respective body bores. Long life of the seals is assured due to the precision bore finish.

Fast reversal of the valve is recognized by the direct control action on the aluminum spool which is the only moving body assembly part. All types are in accordance with J. I. C. specifications and have cast iron sub-bases, so that piping

need not be disturbed for valve maintenance.

The cam and Air Pilot Pressure Control Valves can be arranged for double cam control, double pilot control, or



Beverly SLITTING SHEAR

**MORE POWER . . . Easier Cutting
EXCLUSIVE DESIGN . . . Cleaner Cuts
RUGGEDLY BUILT . . . Last a lifetime
CAPACITIES TO 3/16"**

Get faster, easier slitting and trimming with a new design Beverly "SS" Series Slitting Shear. Rigid, strongly braced frame; compounded linkage and extra strength where needed. Many exclusive features. Write for FREE illustrated Bulletin

See your Beverly Distributor today.

Ask for a demonstration—no obligation.

SS-3 3/16" slitting cap;
5/16" trimming; 1/4"x2"
bar capacity.

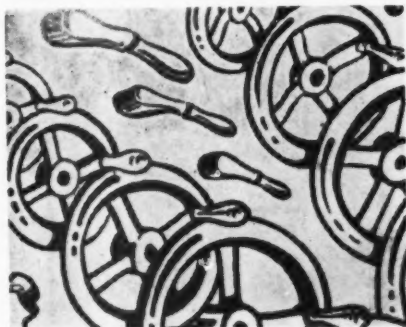
Beverly SHEAR MFG. CO.

3005 W. 111th STREET • CHICAGO 43, ILLINOIS

single control with spring return. All valves have full pipe size orifice areas with a maximum of straight through flow.

Tomco hand wheels and knobs

A complete line of Hand Wheels and Knobs is now available from stock



from Tomco Products Co., 1633 Douglas Ave., Racine, Wis. Both straight and off-set cast iron hand wheels in seven

sizes from 3" to 12" in diameter, with solid or revolving steel handles, are available, either blank or machined. Standard cast iron hand knobs are available in both prong or scalloped types. Prong type knobs range from $\frac{3}{4}$ " to $3\frac{1}{8}$ " in diameter, in nine sizes. Scalloped type knobs range from $1\frac{1}{2}$ " to $3\frac{1}{2}$ " in diameter, in five sizes. The knobs are also available either blank or machined, or with special machining done to manufacturer's specifications.

In addition, Tomco Products Co. furnishes standard malleable iron handles in either the ball or offset types. Three sizes of ball handles from $4\frac{1}{8}$ " to 8" diameter, and three sizes of offset handles ranging from 4" to 6" lengths are available, either machined or blank. Tomco has also available machine handles made from solid bar steel in the revolving or solid types. Four revolving sizes range from $2\frac{1}{16}$ " to $4\frac{3}{16}$ " in length. Solid type handles range from $1\text{-}15/32$ " to $4\frac{1}{16}$ " in seven sizes. All machine handles are polished to a high lustre.

BUY



**Write
Today
For
Literature**

MARSHALLTOWN

FOR LONG LIFE

DEPENDABILITY

PERFORMANCE

Engineered and built to give the utmost in dependable, trouble-free service. More die space—chrome molybdenum cranks, wrist pin connections and many other proven advantages.

MARSHALLTOWN MFG. CO.

**900 E. NEVADA STREET
MARSHALLTOWN**

IOWA

I-G-C relief grinder fixture

A new relief grinder that speeds up all types of cutter grinding operations by as much as 300 % is announced by Western Aero Industries, 3305 Burton Ave., Burbank, Calif.

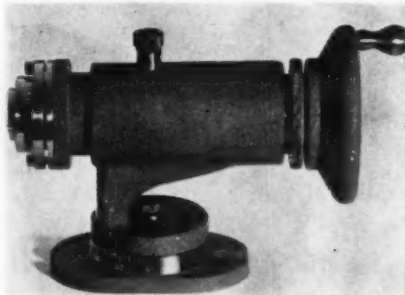
Developed to handle countersinks of all types, center drills, integral pilot cutters, and right or left hand pilot drills, the I-G-C Relief Grinder is designed to operate at maximum efficiency by unskilled help. With only two wrenches, the fixture can be easily adjusted for the correct relief and angle in relation to the grinding wheel.

The I-G-C Fixture fits any standard grinder, and will handle work from 1/16" to 1" in diameter with standard collets. The lift of the single cam is variable from .001" to 1/8", and adjustable pins are provided for 1, 2, 3, 4, and 6 fluted cutter grinding.

By a change of collets, the angle of fixture and the lift cam, the I-G-C Fixture may be set up for various types of grinding operations. Cutting edges

are ground equally, thus considerably reducing frequency of grinding.

Ruggedly constructed to insure permanent accuracy, the I-G-C Relief Grinder's main housing is made of high grade cast iron which supports a hardened and ground spindle on two large bearing surfaces that require only periodic oiling. The cam is hardened



tool steel with steel adjustment pins. The fixture swings 90° to the right or left; base is calibrated in 5-degree increments.

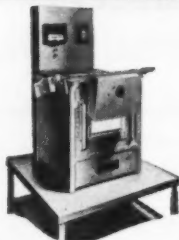
COOLEY HEAT TREATING FURNACES

ELECTRIC BOX TYPE • FLOOR AND BENCH MODELS

For Tools and Small Parts

SHOWN HERE

THE COOLEY BENCH MODEL
for HARDENING AND TEMPERING



Max. Temp.	Sizes	Price
1850°	8" x 6" x 14"	\$220 to \$425
	10" x 6" x 18"	
	10" x 8" x 18"	
2000°	8" x 6" x 14"	

All prices are less controls. Any standard controls available for automatic temperature control.

- Available with hinged or vertical lift door.
- Heating elements fully protected from mechanical or atmospheric destruction.

Brown and Wheelco Control Pyrometers carried in stock—available for all applications.

Free on request: ☐ COMPLETE CATALOG ☐ "SHOP NOTES ON HEAT TREATING"

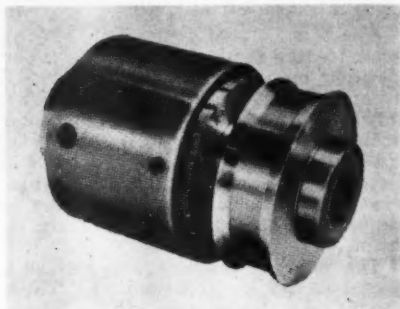
COOLEY

ELECTRIC MANUFACTURING CORP.
36 SO. SHELBY • INDIANAPOLIS, IND.

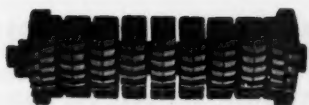
Loading of the fixture can be done in three simple steps: (1) the correct size collet is inserted; (2) work to be ground is placed in the collet and locked in position with the hand wheel; (3) the hand wheel is turned to rotate work against the grinding wheel. A locking pin holds the spindle rigid while the collet and work are being tightened. The spindle can revolve when the pin is lifted.

Flaton automatic safety clutch

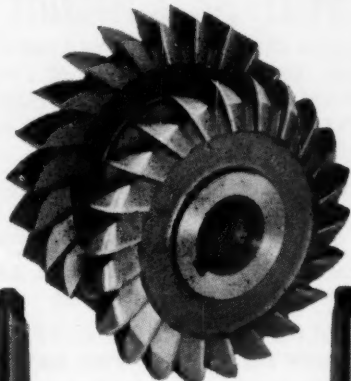
An ingenious automatic safety clutch which protects machines at normal loads has been developed by Flaton Machine Works, 7829 S. Broadway, St. Louis 11, Mo. Among the advantages of this device, besides its completely automatic operation, are that the clutch stops machines on overload and sudden shock. An automatic shut-off signals overload or shuts off the electrical current. It resumes its peak load as soon as the excess burden of the overload is removed. The safety clutch is stated to be efficient at all speeds, even as low as 1 r.p.m. or less. The clutch will operate either clockwise or counter-clockwise. It has a wide range of torque capacities.



The Flaton automatic safety clutch is available in four standard types—with a clutch coupling, with extended hub, for a demountable hub, and a model which is built into other units. These clutches can also be designed to fulfill specific requirements for special adaptations. The material, workmanship and performance of the Flaton automatic safety clutch are guaranteed by its manufacturers.



RUTLAND



SAVE TIME - SAVE MONEY
SAVE TOOLS
For rapid changeover of Tool
setup

SPECIAL TOOLS FROM STANDARD TOOLS

All types of special reamers, cutters, end mills and drills can be made from standard catalog tools. We can make these specials to your blue prints quickly and economically from our large stock of standard cutting tools.

Mail your specifications or blueprints today for immediate price and delivery.

Rutland TOOL SERVICE

1617 E. McNICHOLS • DETROIT 3, MICH.

TW inbrook 3-6240

HIGH SPEED KNURLS

WE STOCK ALL SIZES REED KNURLS IN STRAIGHT, DIAGONAL AND DIAMOND PATTERNS FOR BOTH LATHE AND SCREW MACHINE HOLDERS.

DRILL JIG BUSHINGS

LARGE NEW YORK STOCK FOR AMERICAN DRILL JIG BUSHING CO. WE CARRY THOUSANDS OF HEADLESS PRESS FIT, SLIP RENEWABLE, LINERS, AND HEAD PRESS FIT BUSHINGS.

GOOD DELIVERY FOR SPECIAL SIZES.

SID TOOL COMPANY, INC.

126 LAFAYETTE ST., NEW YORK 13, N.Y.
CANAL 6-4946—4947—4735

ONE OF THE LARGEST CUTTING TOOL DEALERS IN THE EAST.

NIELSEN Heavy Duty

*Live
Centers*

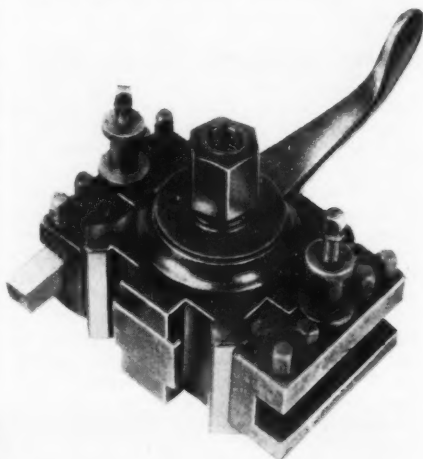
Write for
catalog on
live centers

Adapted
for heavy
duty work.
Precision type
ball and roller
bearings assure
maximum capac-
ity for high speed
production and long
service.

NIELSEN, INC. LAWTON,
MICH.

Tool holder permits 5-tool set-ups

A rugged new universal tool holder, the "Dimco," for quick and accurate clamping on the lathe, is available from Kelvin Systems Corp., 53 Water St., South Norwalk, Conn. Made in two sizes, the unit has been designed to fit any engine lathe for production runs.



The "Dimco" tool holder consists of a main center section which is fixed in position on the compound; it may be rotated through 360° for a set-up for any series of operations. Once the center section of the tool post is placed for the operation, there are three possible positions for any of the tool set-ups, since there are slides on two sides of the main section, and a set of slides in front.

The standard practice is to furnish a 5-tool set-up for each tool post. These consist of a tool set-up with a Morse taper hole for drill chuck or boring bar, a v-type set-up for holding a round bar, and three set-ups for square or rectangular shape tools.

The "Dimco" universal tool holder is provided with a quick-change cam action to permit interchanging of tool set-ups in a minimum of time between operations. Extra tool set-ups of any type are available for the tool posts according to varying needs.

Electronic height indicator

A new type of Electronic Height Indicator is announced by the Sheffield Corporation, Dayton 1, Ohio. It is designed for use in the toolroom and for receiving, process and final inspection where highly accurate measurement is desired from a surface plate reference. Measurements may be taken from above or below a surface without reversing the clockwise movement of the indicator hand from the minus to the plus side of zero on the scale.

An electronic gage head with dual 1000/2000 to 1 amplification, smallest graduation .0001", a balanced scale of plus and minus .0015" and .003 respectively, gives a quick positive and accurate reading. The gage has a vertical capacity of 0" to 26"; the throat capacity from the gaging point to the edge of the column rack is 4½" to 11"; and throat capacity from gaging point to the edge of the base is 3½" to 10".

A sensitive adjustment knob on top of the pickup unit, provides a maximum adjustment of .010" of the gaging stylus.

This feature adds much to the accurate convenient use of the gage and reduces the setup time. The mounting bracket is adjustable vertically on the column to any point within an 18" range by



means of a rack and pinion. The extension arm can be adjusted horizontally to bring the pickup head to any point 4½" to 11" from the column. It is also adjustable radially within a range of 345°.

HAYFRED'S DIAMOND TOOLS

ALL TYPES MADE TO SPECIFICATIONS

★ WHEEL DRESSERS

*Single Point
Single Layer Cluster*

★ RADIUS FORMING TOOLS

★ THREAD GRINDERS

★ VALVE GRINDERS

★ GEAR GRINDERS

★ HARDNESS TESTERS

★ SHAPE TOOLS

★ SCRIBING TOOLS

★ GLASS CUTTERS

★ TUNGSTEN CARBIDE MATRIX

★ CONTACT POINTS

★ DIAMOND POWDER

★ LOOSE DIAMONDS

★ RESETTING SERVICE

Several
territories
available.

POINTS TO HIGHEST PRECISION

Send for folder showing complete line.

OGINZ & HERRING and
DEWAR GLOVE CO., Subsidiaries

HAYFRED CO., 91 BROADWAY, SPRINGFIELD, MASS.

P & W carbide gage blocks

Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn., is prepared to furnish solid carbide precision gage blocks, in addition to its line of steel precision gage blocks—both USA and Hoke. Solid carbide blocks are furnished in all sizes .050" up to and including 4.000". They are sold (1) in sets, (2) individually to replace worn steel blocks, and (3) as wear blocks in sizes .050" and .100". P & W Carbide USA rectangular blocks are manufactured to the same high degree of accuracy as steel USA rectangular blocks. They conform to the generally accepted dimensions of rectangular gage blocks and are recommended for use as replacements for worn blocks in old sets. Carbide Hoke blocks, which are of square design, like their steel forerunners, permit the use of internal tie rods by which rapid, compact assembling of the various attachments is made possible without the use of outside clamps.

Due to their long wear life, these new

P&W carbide blocks will retain their initial accuracy many times longer than steel blocks. One-inch blocks and smaller are accurate to a tolerance of $\pm .000004$ and $-.000002$ of an inch, and



sizes over 1" are accurate to the same tolerance per inch of length.



You're a Production Winner with **Economy** Drill-Jig Bushings and Gages

Yes, they're in stock, ready to go out to you — all A. S. A. standard types and sizes. You can also get fast service on new gages or gages salvaged by hard chromium plating . . . precision-finished, durable. Write for bulletin and price list.

Economy

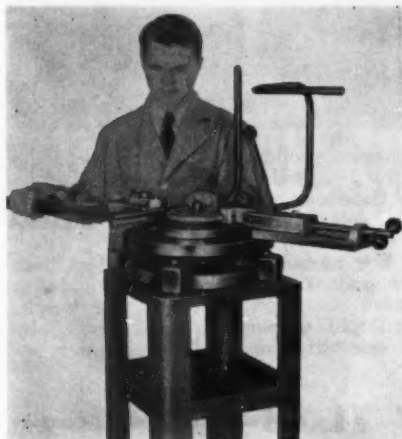
TOOL & MACHINE CO.

1829 SOUTH 68th STREET • MILWAUKEE 14, WISCONSIN

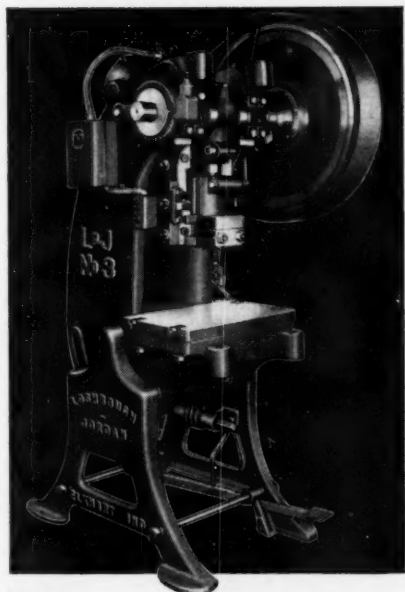
P&W carbide precision gage blocks are made from a premium grade of carbide which has the essential qualities necessary for excellent surface finish, maximum resistance to wear and high degree of stability. The measuring surfaces of each block are precision lapped at 68°F. These carbide gage blocks have excellent wringing qualities and are rust and corrosion resistant.

Clamp accessory for use on Di-Acro benders

A new accessory for Di-Acro Benders, known as the Quik-Lok Clamp, has recently been introduced by O'Neil-Irwin Manufacturing Co., 314 Eighth Ave., Lake City, Minn. This useful device is available for all No. 2 and No. 3 Di-Acro Benders now in use. It can be readily mounted merely by bolting it onto the bender's base, as indicated in the picture below, showing an operator with the Di-Acro Bender, No. 2.



This quick-acting clamp is said to be ideal for use when bending tubing, angles, channel and extrusions, as it securely locks these sections during the forming operation, thereby assuring a perfect bend. The wide opening jaws permit easy removal of the formed part. The clamp will accommodate all materials within the capacity range of the Di-Acro Benders, and can be readily adjusted for any radius to 9".



L&J PRESSES

for Fast, Low-Cost Production

It's the speed, accuracy and dependability of L & J Presses that enable them to produce low-cost stampings and drawings. You will find that this efficiency can be profitably utilized in the manufacture of a wide variety of parts.

Their rugged construction gives you longer die life... better work... less maintenance. It will pay you to find out how these O.B.I. presses can give you better production. Made in 12 models—back geared and plain flywheel types—6 to 80 ton capacities.

Write for literature.

L&J PRESS CORP.

1625 Sterling Avenue
ELKHART, INDIANA

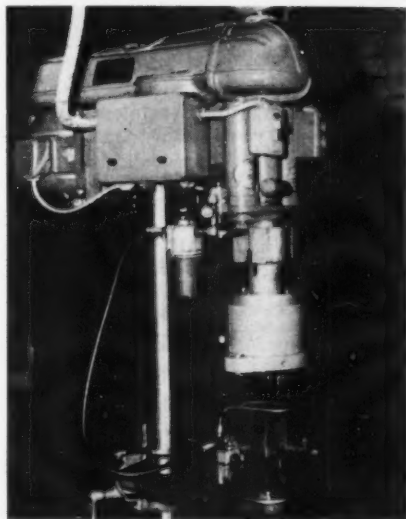
Air-controlled tapping and drilling machine

The illustration below shows a Beckett Air-Controlled Tapping and Drilling Machine in the plant of an electrical parts manufacturer. The job performed is tapping 11 holes in a $\frac{1}{16}$ " steel stamping. Nine of the holes are tapped with No. 8-32 taps and the other two holes with No. 6-32 taps, direct from a multiple spindle drill head. Previous production methods required three men operating three drill presses to achieve 700 pieces per day. Now, one man operating the Beckett Tapping and Drilling Machine produces 3000 pieces per day.

These versatile units are made by Beckett-Harcum Co., Dept. FE, 1140 Wayne Road, Wilmington, Ohio. They are designed to meet specific production requirements, and provide greater flexibility of operation. Many units are now in operation in the field doing fine drilling and tapping work in a variety of alloy steels, including stainless, as well as alloy castings, brass, aluminum, magnesium, plastics and wood. Tapping operations are being performed with outstanding success in punched, formed and extruded holes, as well as conventional drilled holes. A Class 3 fit and high production can be maintained in tapping magnesium with either single or multiple spindle set-ups.

The Beckett Tapping and Drilling Machine will do multiple tapping or drilling, using standard multiple spindle drill heads, without employing lead screws, clutches or tapping heads, through precise control of air power to

feed the tap or drill through the work. For tapping work, the drill press air power feed requires only light air pressure, which permits the taps to form their own lead. There is no forcing of the tap, and no galling action results.



Threads produced are duplicates of the taps used and Class 2 and 3 fits can be obtained in soft metals and plastics as well as in stainless and chrome-molybdenum steels.

For normal tapping work, less than 10 p.s.i. air pressure is adequate to move the taps through the work. Multiple tapping is accomplished by using a high reversal motor which re-

NO MORE COSTLY JIGS

on small production jobs with
Troyke Worm Wheel Operated Tables

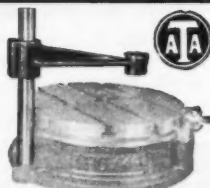


Sizes:

9 - 12 - 15 - 18 - 21 - 25

See your dealer or write for Catalog No. 17.

Fully illustrated, showing all models and applications to various work.



Drilling attachments can now be furnished for Worm Wheel Operated Tables.

TROYKE MFG. CO., Cincinnati 9, Ohio, U.S.A.

verses the taps at the instant the correct depth is reached. The taps then lead themselves out, without stripping the last thread, even in extruded holes in soft metals. The standard unit is capable of a complete cycle every three seconds. Where a fast cycle is required, these units can be supplied with motors capable of 85 idle reversals per minute.

Other features of the Beckett Tapping and Drilling Machine include automatic lubrication of taps and drills by an atomized oil film applied by an air blast. Chips are blown clear and taps and drills simultaneously cooled and lubricated on both the forward and return stroke. This feature makes it possible to maintain accurate threads where Class 3 fits are required. On fast cycle operations, taps remain cool, holding their true diameters and avoiding metal pick up. The lubricating system will not produce oil fog in the air to cause a fire hazard or unhealthy breathing conditions. No coolant system is required. Light work can be air ejected from the fixture, making pos-

sible extremely fast production as the operator is only required to load the work. Operation can be either full automatic or single cycle and a foot switch is supplied for single cycle operation.

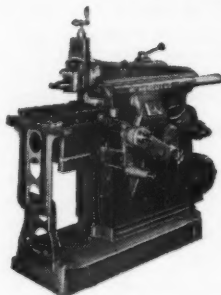
Metalix small parts press

The Metalix Micro Press is the first of a line of tools for instrument and small parts production to be announced by Metalix Manufacturing Co., 26 Fitch St., Norwalk, Conn.

The Micro Press is a small, versatile press for light duty precision operation in staking, punching, piercing, reaming, broaching, marking, forming, and riveting. Tools are guided by an adjustable cross arm mounted on a tool steel column. A hardened, ground, and lapped tool steel guide bushing in the cross arm insures continuous, positive tool alignment. The standard adjustable fixture plate mounted on the base is hardened and lapped for accuracy, and contains 21 holes ranging from 0.013" to 0.185" in diameter. Clearance between the fixture plate and cross arm

16" & 22" HERCULES HIGH SPEED PRECISION SHAPERS

ECONOMICAL • SIMPLIFIED CONTROL



16" Shaper

Automatic Pressure Lubrication.

Cutting Speed Indicator.

6 Speeds, R.P.M. 26-152.

V Belt Motor Dr.

22" Shaper

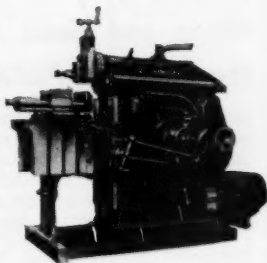
Power Downfeed

Universal Table

Cutting Speed Indicator

8 Speeds, R.P.M. 12-132.

V Belt Motor Dr.



ATTRACTIVE DELIVERY

Illustrated Quotation Will Be Made Upon Request

PARKER MACHINE COMPANY, Inc.

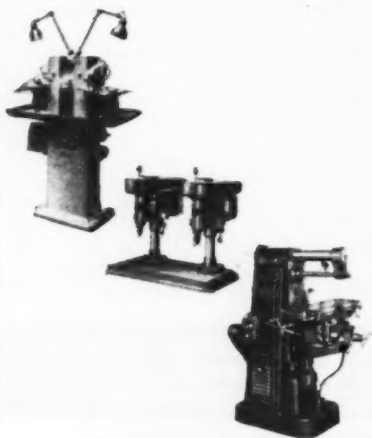
158 PIONEER STREET

BROOKLYN 31, N. Y.

TRiangle 5-2103 5-2157

— IMPORTED — MACHINE TOOLS

Highest Craftsmanship,
Attractive Prices And
Deliveries—No Priority Needed



I Can Supply At Attractive
Prices and Good Deliveries
the Following Machine Tools

Lathes
Milling Machines
Shapers
Power Presses
Drill Presses
Filing Machines

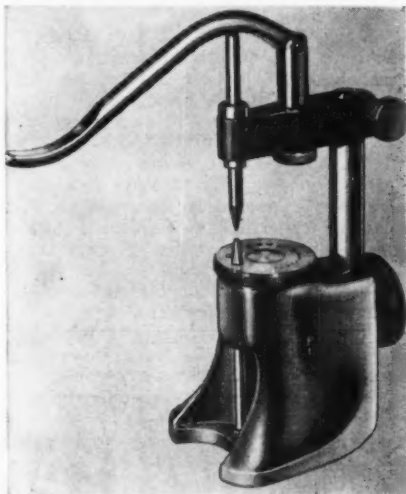
Chuckling
Machines
Screw Machines
Grinders
Horizontal Boring
Machines, Etc.

Interested parties should send in a list of their requirements, on receipt of which full specifications will be mailed, together with prices and delivery dates.

RICHARD J. BAMBRICK
125 BROAD STREET
New York 4, N.Y. Whitehall 4-9156

is adjustable up to 1¼". Standard models are provided with a hand press lever. A variety of punches with a wide range of end shapes and sizes are maintained in stock.

A special model is also available with a micrometer depth adjustment. Special tools, fixtures, and power adaptations are

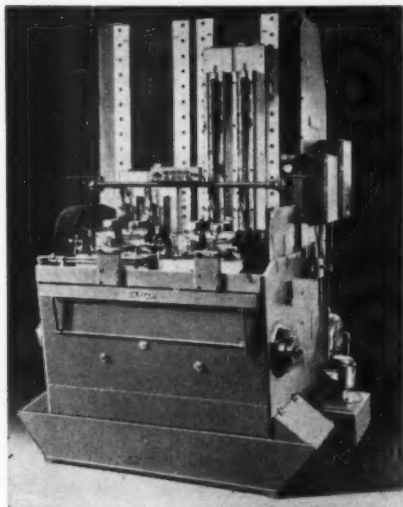


also available on order. Precision piercing of a 0.0020" diameter hole in 0.010" stainless steel is one example of the many applications in which the Micro Press has already proved itself in production. This tool was also used as a fixture and press to manufacture curvatures for the Nilsson Dial Bore Gage.

Oilgear surface broaching machine

A new Type XD-50x66" stroke double slide vertical Surface Broaching Machine has recently been introduced by The Oilgear Company, 1560 W. Pierce St., Milwaukee 4, Wis. This new unit will remove approximately 0.28" of stock from surfaces on large truck engine connecting rods and caps in one pass, at the rate of 380 (190 rods and 190 caps) per hour. Duplicate sets of hydraulically and manually operated fixtures with associate tools are used to finish the rod and cap half-rounds and joint faces with tongues in sets.

In operation, a cap is loaded in the left-hand half of the fixture, and a rod is located over a pin in the right-hand half of the fixture. The clamping lever is moved to hold the rod down. The valve lever is moved to clamp the cap hydraulically and pull the lock under the rod clamping the lever cam. As the shuttle table moves forward to the broaching position, spring-operated cam locked bars back up the rod at the bolt faces.



An exclusive work table shuttling mechanism is confined in the knee bracket. The work table is locked and pre-loaded in broaching position to resist peak tonnage tool face angular thrust. The machine is designed with wider and longer tool slides, larger work tables, centralized push button controls, simplified piping and wiring, and a modified frame and base. An Oil-gear two-way variable delivery pump with electro-hydraulic control is directly connected to a 40 h.p. electric motor.

The peak capacity of the machine is 75,000 lbs. Cutting and return speeds are variable up to 33 f.p.m. The tool slide is 23" x 77½"; the shuttle table is 27" x 21". Throat depth is 8". The table height is 73¾". The machine measures 161" high x 104" wide, 130" front to back.

HAVE YOU A MARKING PROBLEM?



We've been solving them for industry for nearly 60 years. Stamps and marking devices for all purposes.



Steel stamp and dies; roller dies, embossing dies; machine engraving. Dies and Plates. Write for catalog.

Marking Devices Since 1893

MERKERT AND SONS

146-16 JAMAICA AVE., JAMAICA 2, N.Y.

DIAMOND TOOLS RESET

PROMPT SERVICE
for all types of tools regardless
of manufacture.

- Cast Beryllium Copper Matrix
- Precision Tools Centered Within .001"
- New Shanks on Each Resetting

\$1 EACH

TOOLS WHEELS POWDER HONES

Please Write for New Catalogue

305 East 45th Street

New York 17, N. Y.

Tel:

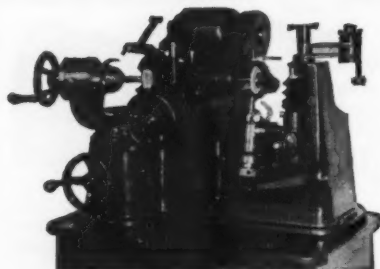
MURray Hill 4-0466-7-8



Diamond
Tool Research Co., Inc.

FOREMOST IN DIAMOND TECHNOLOGY

HYBCO TAP GRINDER



MODEL 1100

CHAMFER
Sharpening



FLUTE
Sharpening



GUN POINT
Sharpening



• Capacities No. 8 Machine Screw to
1½" Hand Taps.

HENRY P. BOGGIS & CO.
710 East 163rd Street
Cleveland 10, Ohio

Automatic punch press loader

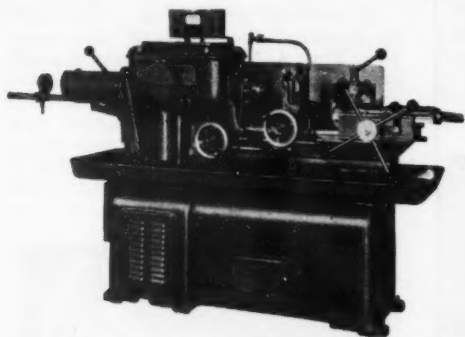
A new type of automatic punch press loader is announced by the Magnaflux Corporation, 5900 Northwest Highway, Chicago 31, Ill. Punch press speeds on redraw operations increase by 10% to 60% over hand feeding, with the use of the new Lodac Feeder, with operator safety assured by removing the operator from the press feed job.

With the Lodac Feeder, mechanical "fingers" pick up parts after first draw, and feed one or more consecutive redraw presses at speeds up to 1200 parts per hour. Similar "fingers" remove the parts from the press to feed them on another conveyor to feed further press operations.



For a wide range of redraw operations, this new automatic Press Feeder eliminates slow hazardous hand feeding. In actual operation, for a single redraw, press speeds have been increased from 540 pieces to 1040 pieces per hour.

The complete operation cycle is set by the speed adjustment of the Lodac Press Feeder. At the proper point after loading, the press is tripped by the feeder, with either electric or air triggering. If the part is not removed from the die, a "safety" circuit stops both feeder and press. However, if parts are not being loaded to the die, a "memory"



Plain or Back-Geared — Forged steel spindle with anti-friction precision bearings, friction clutch and brake. Spindle nose, $2\frac{3}{8}$ "-8.

Write today for complete details.

SIMMONS MACHINE TOOL CORP.

1725 North Broadway, Albany 1, N. Y.

New York Offices: 58 East 42nd Street

HERE IT IS!

The new Simmons No. 2 Turret Lathe, offered to you with three distinct advantages:

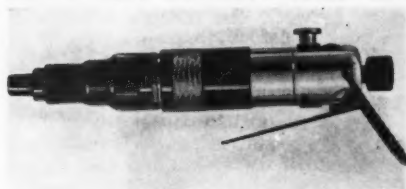
- **Low Cost**
- **High Precision**
- **Early Delivery**

$1\frac{1}{4}$ " bar capacity . . . 14" swing over ways. Micro-Speed Drive offers infinite speeds—plain, 375 to 1500 RPM; back-geared, 44 to 750 RPM—**for bar or chucking work.** Power feed to turret.

circuit will continue to operate the press and feeder thus avoiding shutdown delays. After any shutdown, the "memory" circuit starts the Lodac Feeder and press at the point of the cycle where it was last interrupted. The mechanical "fingers" are specially designed for parts to be handled, and are held in special chucks for quick change between press runs.

Aro screw driver and nut setter

A new air-powered screw driver and nut setter, Model 7500, designed with a push-button control providing instantaneous reverse action, is announced by the Aro Equipment Corp., Bryan, Ohio.



The tool's new push-button valve is stated to introduce a new concept of rapid change from forward to reverse action in screw driving and nut setting. The operator merely presses a button on the tool and the action is instantly reversed. When forward motion is again desired, the operator removes his thumb from the button which is instantly spring-released.

The tool need not be removed from the work and no time is required for adjustment. The operator always has one hand free, to handle screws.

The tool has an adjustable clutch which can be pre-set to the correct torque requirements. Clutch jaws automatically disengage when screw is set to the desired tension.

The new Aro tool is said to combine lightness and speed with power and endurance. It is designed for continuous high-speed production, having a speed of 1800 r.p.m. and a built-in speed regulator. Its capacity is No. 0-8 machine screws. It can be quickly converted for nut-setting. The overall length is $7\frac{1}{4}$ "; outside diameter is $1\frac{5}{16}$ ".

FREE! FREE!

Liberal Size Sample of Famous

MOTOR MICA

TRADE MARK REG. U. S. PAT. OFF.

COOLING

ANTI-FRICTION COMPOUND

In White Powdered Form

**COOLS
HOT
BEARINGS
QUICKLY**



**SAVES
WEAR
ON
MOVING
PARTS**

Find out how Motor Mica can put an end to your lubricating problems. Try it with your cutting oils, in die-casting, deep-drawing, metal stamping, etc. Write on your business letterhead for free sample. No obligation.

**Keeping the Wheels of Industry Cool
Since 1914**

Packed in 5, 10 & 25 lb. Containers

SCIENTIFIC LUBRICANTS CO.

3469 N. Clark Street • Chicago 13, Ill.

C L E A R

**NAMEPLATE
MARKING**

**MODEL
No. 4**



The nameplate on your product is your signature; keeps it neat and legible! Accurate location and alignment are assured

with this
**NAMEPLATE
DETAIL PRESS**

- Simple Operation
- Perfect Alignment
- Uniform Depth

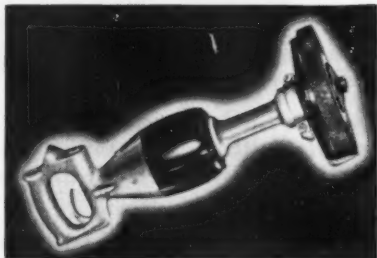
GEO. T. SCHMIDT, INC.



1804 W. BELLE PLAINE AVE.
CHICAGO - 13 - ILLINOIS

I-R introduces new air grinder

A new air grinder, just announced by Ingersoll-Rand Co., 11 Broadway, New York 4, N.Y., has an added safety device to prevent overspeed operation and possible accidents. This tool has special application in foundries, steel mills, general manufacturing and metal-working plants where hand grinding is required for snagging, trimming, smoothing, etc.



The new grinder contains a motor governor to maintain the correct wheel speed, plus a built-in unit called the "overspeed safety coupling." In case the motor overspeeds because of governor wear, abuse, maladjustment or dirty air, the "overspeed safety coupling" automatically uncouples the arbor and the grinding wheel from the motor, making it impossible to operate the grinder until the cause of overspeeding has been corrected.

Another safety feature of the grinder is a multiple exhaust system. The operator can choose any one of four exhaust positions, spaced 90° apart, and thus direct the exhaust away from the work and from himself. Special muffling reduces the exhaust noise so that it takes ten of the new grinders to create the same noise as one of the previous machines.

The grinder has a safe-carrying grip type handle, designed with enough space between the throttle lever and the back of the handle for a comfortable hand hold. This permits the grinder to be safely carried while connected to the air line.

The grinder is available for 8", 6", or 5" wheels, running at respective motor speeds of 3100, 4100 and 4500 r.p.m.

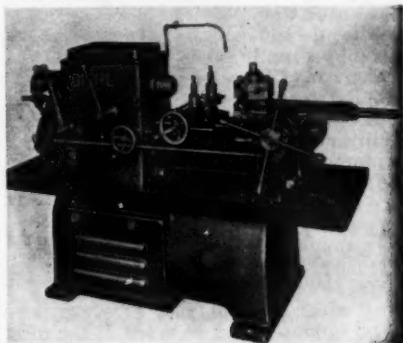
Diehl No. 2 turret lathe

The G. M. Diehl Machine Works, Inc., Wabash, Indiana, is now producing its No. 2 Turret Lathe in quantity. The Diehl No. 2 Turret Lathe also filled a vital breach in production lines in World War II. "They quickly proved their dependability and efficiency under severe around-the-clock war pressure," Diehl officials point out.

"The present mobilization program and the urgent needs of industry for a turret lathe of the type designed and built by Diehl is given top priority in this phase of company operation, and the No. 2 Turret Lathe is now in full production."

Designed for high speed, precision production, the Diehl lathes are standard size and use the same tooling, including collets, as other standard No. 2 sizes. Belt driven transmission provides positive, even power flow for smooth, accurate cutting, and easy operation. Constructed with ample capacity for extreme production requirements, they provide vibration-free, trouble-free, economical service.

The Diehl No. 2 Turret Lathe is available in two types, hand feed and power feed. The types with power feed to the turret are available with screw feed cross slide or lever feed cross slide. The hand feed type is available



with lever feed cross slide. Automatic chuck capacity (round) is 1 inch; swing-over cross slide is 6 inches, and swing-over bed is 14 inches.

BIG JUMP FORWARD

in Boring and Facing!

Our
Model "D"



All Models Have
POWER FEED
for Facing

• A Boring Head
that Won't Face
is Not Complete

Six
Sizes
Available



RE-DESIGNED
Many New Features

Write Today for Complete Details

CHANDLER TOOL COMPANY, MUNCIE, INDIANA

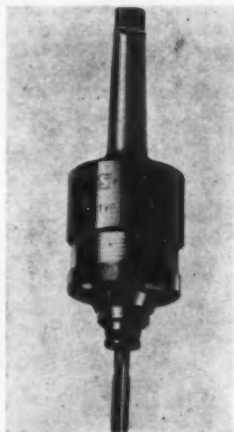
COMBINED BORING &

FACING TOOL HEADS

Chandler-Duplex

High speed tapping attachment

A new field of operation in the engineering industry is opened up with the S. P. V. Tapping Attachment recently developed by Eric S. Johnson Co., 230 E. Ohio St., Chicago 11, Ill. Untrained operators can undertake the mechanical tapping of components in either light metal or toughened steel without risk of scrap, and hand tapping, even on work of the most precise nature, will be superseded by machine tapping wherever this procedure can be applied.



With this attachment, it is possible to machine tap holes at a cutting speed of 300 f.p.m., and to tap blind holes in light metal on an ordinary drilling machine using spindle speeds of up to 2500 r.p.m. The thread produced will be as good as the tap which forms it, and the surface will be just as clean. It can be used in drilling machine, lathes, milling machines, etc., and ordinary hand taps or machine taps of standard types with ground profiles may be used.

Elimination, as far as possible, has been made of the friction in the axial motion of the tap, relative to the tapping attachment. The problem was solved by arranging steel balls between the body of the attachment and the tap holder, thus allowing the two units to roll freely within the determined limits. It is fitted with a slippage clutch which prevents overloading and automatically arrests the tap when it reaches the bottom of the hole.

With the Eric S. Johnson S. P. V. tapping attachment, it is possible to

NEW PORTMAN "century"

Latest accomplishment of a progressive producer with long, broad experience in micro-projection optics...

FEATURING:

- 1) "Super-Light" condenser lens, power cooled.
- 2) Portman "Ciptar-Scope" precision optical system provides maximum illumination with sharpest definition... for large optical capacity.
- 3) Focal length average in excess of 3 inches.
- 4) Magnifications: 10x, 20x, 25x, 31 1/4x, 50x, 62 1/2x and 100x are standard.
- 5) Large 16-inch diameter "Sight-Line" screen.
- 6) New "Swing-Away" stage (removable) also provides helix angle positioning.
- 7) Rugged chassis assures permanent alignment.
- 8) Price: Only \$885.00 complete with choice of one lens.

The Portman "Century" is the ideal optical comparator for the tool room, for gage inspection and for production shop work. Write or wire for details.

Territories open for agents with gage and measuring equipment sales experience.

OPTICAL COMPARATOR

Vertical Model C-100



Height 64"
Width 23"
Depth 35"
Net 350 lbs.

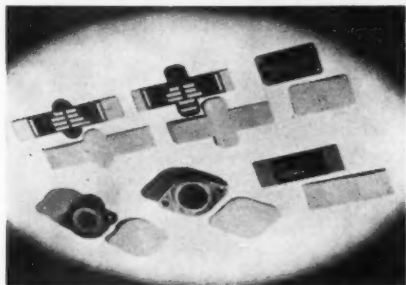
PORTMAN INSTRUMENT COMPANY

6 Manhasset Avenue, PORT WASHINGTON, N. Y.

maintain maximum cutting speeds according to the material being worked, i.e., 300 f.p.m. for light metal, 180 f.p.m. for brass and 90 f.p.m. for tool steel. This applies to the tapping of blind holes as well as through holes.

Self-adhesive masking material

To meet the need for a fast method of masking products during various

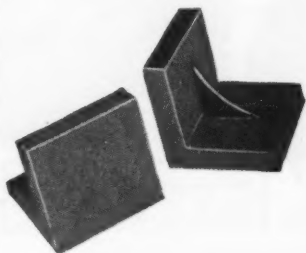


stages of production, the W. H. Brady Co., 1602 E. Spring St., Chippewa Falls, Wis., has announced a development

known as Quik-Masks. These handy self-adhesive, pre-cut masks and gaskets can be quickly applied without moistening to the areas requiring protection. They eliminate cutting out masks by hand, expensive metal masks, tedious hand outlining, etc.

Quick-Masks are stated to be useful for masking name plates, dials, gauges, machined parts, holes, threads, plated and polished sections, etc. They provide positive protection during spray painting, cleaning, plating, machining, tumbling, sandblasting, buffing, polishing and other production operations, according to the W. H. Brady Co.

These products are made from "Scotch" Brand pressure-sensitive masking tapes. They come pre-cut to the exact size and shape required, and are either mounted on cards, several masks to a card, or individually, with each mask having its own folded liner on the adhesive side. Card-mounted masks are peeled from the card. When using individually mounted masks, one removes the folded liner from the mask,

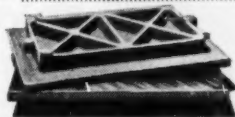


GROUND SURFACE PLATES

12" x 18"\$27.50

GRAY IRON **ANGLE PLATES** MACHINED $\pm .002$ FROM FLAT

2" x 2" x 2"	\$ 2.70
3" x 3" x 3"	3.60
4" x 4" x 4"	4.40
5" x 5" x 5"	8.40
6" x 6" x 6"	10.90
8" x 8" x 8"	16.70
12" x 12" x 12"	39.50



UNFINISHED BACK PLATE CASTINGS FOR CHUCKS

6"\$1.95

8"\$5.40

10"\$9.50



RAND TOOL & SUPPLY CO.

231 CENTRE ST. • WORTH 4-6671 • N. Y. 13, N. Y.

Prices FOB New York City—
Order Today.
Dealer Inquiries Invited

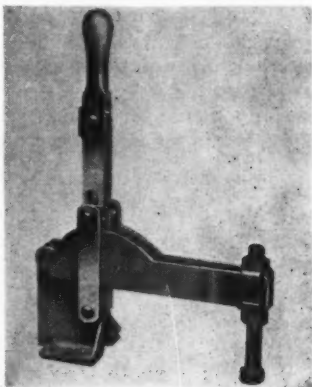
We Also Carry
Drills, Taps, Dies, Reamers,
Milling Cutters, Etc. in Stock

Knu-Vise heavy duty clamps

Four heavy capacity quick-action clamps have been added to the line of Knu-Vise clamping devices by their manufacturer, Lapeer Manufacturing Co., Lapeer, Mich. These clamps are said to be the only big cam clamps that provide a convenient means for locating and adjusting the spindle assembly along the toggle bar. They simplify applications where parts having varying thicknesses (such as heavy castings and larger forgings), can be held without altering the initial setting, or where parts which are sprung can be aligned before welding. The spindle assembly can also be replaced by a special pressure pad to suit particular clamping applications.

The Model CAV-1200 (illustrated), has a recommended force of 1200 lbs. at the end of the toggle bar, and 2550 lbs. with the spindle located $3\frac{1}{2}$ " from front of base. The Model CAV-2000 (slightly larger) has a recommended force of 2000 lbs. at the end of the toggle bar, and 4150 lbs. with the spindle $3\frac{1}{4}$ " from front of base.

Models CAS-1200 and CAS-2000 are similar to the above but have the additional advantage of permitting the toggle bar to swivel around the base to



any position within 180°. This widens the scope of applications. Similar models are available with toggle action (fixed locking).

"MITI-MITE" No. 200

The New, Amazing Magnetic Base
"Handi-Lite" for mounting on curved or
flat surfaces INSTANTLY!



ELIMINATES HAPHAZARD CUMBERSOME CLAMPING

Rayon flocked coated
shield to resist heat.
25 and 40 watt bulbs
included.

Flexible ball and
socket swivel con-
struction permits pre-
cision adjustment.

Base size—1"x1 $\frac{1}{8}$ ". Holds rigidly
wherever placed.



Magnetic pull
app. 50 lbs.

6 Ft. plastic
cord, 110 V.
AC-DC.

OTHER "MITI-MITE" UNITS

No. 100	Magnetic Base Holder for most smaller indicators.	\$ 7.50
No. 120	Combination Test Indicator Magnetic Base Holder and 4X Doubles lens Magnifier	12.00
No. 150	Duplex Magnetic Base holder for all dial indicators up to 3" dia. ...	15.50
No. 300	Combination of No. 100 and No. 200	15.50

Send for Bulletins 602 and 603

Order from your mill supply dealer or send order
with name of your mill supply dealer

ENCO MANUFACTURING CO., Dept. 2111
4524 W. Fullerton Ave., Chicago 39, Illinois

BRING YOUR CARBIDE PROBLEMS TO

ADAMAS

Carbide Corporation
HARRISON, NEW JERSEY

at

BOOTH H-218

**NATIONAL METAL EXPOSITION
DETROIT • OCTOBER 15-19, 1951**

District Managers MACHINE and TOOL BLUE BOOK

These men are excellently equipped by training and experience to work with manufacturers, advertising agencies and others interested in the promotion and sale of their products to readers of MACHINE and TOOL BLUE BOOK. Contact direct or through our Wheaton office.

NEW ENGLAND and EASTERN N. Y. STATE

Dan E. Reardon
Box 259
South Glastonbury, Conn.
Telephone: Glastonbury 3-2400

NEW YORK METROPOLITAN AREA

Alvin E. Wailes
c/o Hitchcock Publishing Co.
55 W. 42nd Street
New York 18, N. Y.
Telephone: LA ckawanna 4-4528

PENNA., N.J., & S. ATLANTIC STATES

Raymond J. Sietsema
c/o Hitchcock Publishing Co.
55 W. 42nd Street
New York 18, N. Y.
Telephone: LA ckawanna 4-4528

WESTERN N.Y. STATE, WESTERN PENNA.

Ralph E. Helfrick
1507 Edgfield Rd.
Cleveland 24, Ohio
Telephone: HI lcrest 2-0189

**OHIO, EASTERN MICHIGAN, INDIANA,
KENTUCKY**

Henry J. Smith
3529 Radcliffe Rd.
Cleveland 21, Ohio
Telephone: ER leview 1-0550

MIDDLE WEST, WESTERN MICHIGAN

James C. Stewart
222 E. Willow Ave.
Wheaton, Ill.
Telephone: WH eaton 8-3400

DENVER, COLORADO

Henry J. Niekerk
1838 South Emerson St.
Denver 2, Colo.

CALIFORNIA & ARIZONA

Keith Evans
3757 Wilshire Blvd.
Los Angeles 5, Calif.
Telephone: Dun 8-2981

HITCHCOCK PUBLISHING CO. Wheaton, Illinois
Telephone: WH 8-3400

SAVE ON PRODUCTION TOOLING COSTS with

CARDINAL ~~SPEED VISE~~

The exclusive, quick-acting clamping mechanism of SPEED VISE accommodates a wide variety of parts.

A HUNDRED JIGS IN ONE

Drill jigs are simpler, smaller and cheaper when made for use in a SPEED VISE.

SEND FOR NEW LITERATURE

~~SPEED VISE~~ Stocked by leading Distributors

CARDINAL MACHINE COMPANY

GLENDAL, CALIF.



Unloading attachment for gear shaving machines

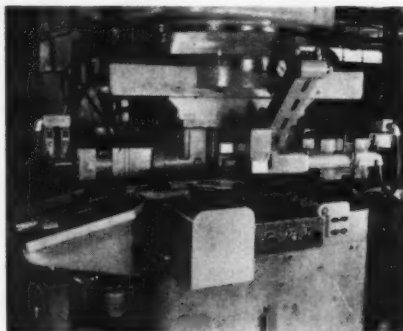
A universal, self-contained, automatic unloading attachment for rotary gear shaving machines has been introduced by Michigan Tool Co., 7171 E. McNichols Road, Detroit 12, Mich.

The attachment is stated to be especially adaptable to the unloading of small gears when automatic loading is employed. Use of the attachment cuts costs by reducing operator fatigue and permitting one operator to service more machines.

A typical application of the unloader is shown in the picture at the right; guards have been removed from the machine for clarity. The unloader consists of a small wire-mesh belt which travels over two drums. Drive is from a low-horsepower electric motor; slots in one mounting bracket allow adjustment to take up slack in the belt.

Since the wire-mesh belt moves at a relatively low constant speed, it permits cutting fluids to drain back into the machine before the gear is dis-

charged into the collecting pan. The belt has a certain amount of "give", which prevents damage to the finished gear either from striking a conventional metal chute or another gear. (Metal in the belt is softer than the gears.) The



belt is stated to have long life expectancy as well as freedom from damage from the cutting fluid.

The unloader can be quickly attached to any Michigan Tool Company 870 or

MELCO CENTER POINT LUBRICANT

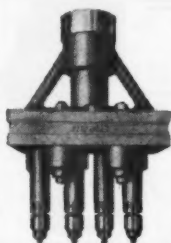
SOLD IN TUBES, QUARTS, GALLONS, DRUMS

Made in both oil and grease form . . . designed for use on lathe and milling machine centers; grinding machine centers; steady rests and heavy journals; tapping, broaching and extruding; any application where extreme pressure or frictional heat prevails. Reduces frictional heat . . . thus an excellent additive for cutting, broaching or drawing oils.

SEND TODAY FOR FREE SAMPLES

C. B. TEETER

4470 OAKENWALD AVE., CHICAGO, ILL.
Phone DRexel 3-3571

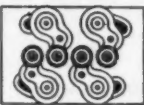


MULTIPLE SPINDLE DRILL HEADS ADJUSTABLE TO STRAIGHT LINE AND RADIAL PATTERNS

FIXED HEADS TO SPECIFICATIONS

LITERATURE ON REQUEST

NOBLE MACHINE TOOL CO. 195 Weeden St., Pawtucket, R.I.



870A automatic gear finisher in any of several positions. No changes in the machine are necessary except to drill and tap a few holes for mounting brackets and the discharge chute.

Alpine mechanical furnace loader

A new mechanical furnace loader, especially designed to speed up heat treating operations, has been developed by A. D. Alpine, Inc., of 11837 Teale St., Culver City, Calif.

This loader speeds loading and unloading operations by eliminating single piece handling. All work to be treated is placed on the frame of the loader, which will handle several layers of work at one time, and the entire load picked up and inserted into the furnace by the fork bars of the loader.

Unloading is accomplished simply by inserting the fork bars and withdrawing the load from the furnace. Entire load is then wheeled to the quench tank or the next operation, and by hydraulic release quenched or placed at

any desired level. During the entire operation, the operator is protected from heat by a built-in metal shield.

In addition to speeding production by permitting more work to be heated and



quenched during each cycle, this Contro-Therm Fork Lift Loader offers around-the-plant usefulness as a hydraulic operated lift truck.

AMAZING . . . NEW . . .

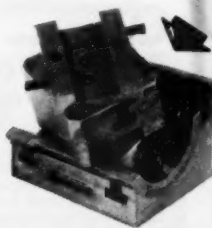
Compound angles without parallels

Yes, you can now grind compound angles in your tools without the use of angle parallels, without charts or books, without involved mathematical computations. You will save time and

money through easier and faster grinding. By using this vise for carbide sharpening you will save valuable carbide which is usually lost when free-hand grinding. Easy to use. Use on any surface grinder.

Write now for further detail and prices.

Distributors: choice territories open.



COMBINATION VISE and JIG CO. ORFORDVILLE WISCONSIN



REYNOLDS

MAGAZINE FEED POWER SCREW DRIVING MACHINES

Assembly operations are speeded up and done more efficiently with a Reynolds. Reduces costs too. Illustrated is only one of a complete line of screw driving machines for every application. Write today for catalog.

AUTOMATIC HOPPER FEEDS

Costly handling operations are eliminated when parts are delivered automatically to work position. Motorized hopper. Parts arranged and fed as required. Send sample of part to be fed when writing for quotation. No obligation.



COOK & CHICK CO.

640 S. MILLER ST.

CHICAGO 7, ILL.



HAND WHEELS

HAND KNOBS

MACHINE HANDLES

HANDLES

BALL HANDLES

SPECIALTIES

Write for literature



1435 DOUGLAS AVE.
RACINE • WISCONSIN

Blank or Machined - from stock

Long
It's all in a Lifetime

SECOMET Diamond WHEELS

cut faster
run cooler
and give
long life

J. K. SMIT & SONS
General Offices and Plant: Murray Hill, N. J.
J. K. SMIT & SONS
of MICHIGAN • CANADA

OPEN

CLOSED TRADE **AUTOM** MARK

OPEN

Plain Type

Offset Type

CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET

AUTO MOULDING & MFG. CO.

1110 E. 87TH ST.
CHICAGO 19, ILL.

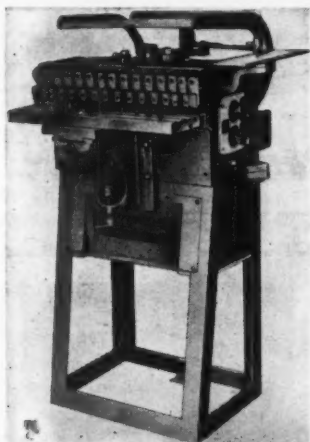
SPECIFICATIONS:
Open width $\frac{1}{8}$ " to 6"
Gage Material .040 to .125
Pin Diameter .101 to $\frac{3}{16}$ "
Lengths to 120"

SEMI-OFFSET

Electric etcher marks 15 pieces at one time

Tools, gages, parts for automobiles, aircraft, engines, and machinery—as well as cutlery and other consumer merchandise—can be marked rapidly, and uniformly with the Taylor-Hobson “Javelin” Etcher, distributed exclusively by Engis Equipment Co., 431 So. Dearborn St., Chicago 5, Ill.

This machine can handle up to fifteen work pieces at one time, etching on hard or soft metals, flat or curved surfaces, with identifying numbers, names, trademarks or designs.



The marking is produced by means of a series of minute electric arcs, formed at the point of a rapidly vibrating electrode linked to a pantograph. The pantograph, which controls the fifteen “javelins,” is guided in specially prepared intaglio “copy,” by a single operator, without previous skill or training.

The “Javelin” method offers maximum flexibility for the shape and size of the work-piece—for design and depth of mark. A piece may be etched in its finished state without prior or after-treatment. The work is clean, safe, accurate, leaves no burrs, and will not damage or weaken the product. Production is claimed to be faster than conventional marking or acid etching.



*“It happens every time they nab Dinsmore.
The guy has a grip like a JACOBS CHUCK!”*

IF IT'S A
JACOBS
IT HOLDS

The Jacobs Manufacturing Co., West Hartford 10, Conn.

Automatic valve face grinder

The Landis Tool Company, Waynesboro, Pa., manufacturers of precision cylindrical grinders, have developed an automatic valve face grinding machine. This unit is a high production machine, specially designed for grinding the internal combustion engine valve faces.

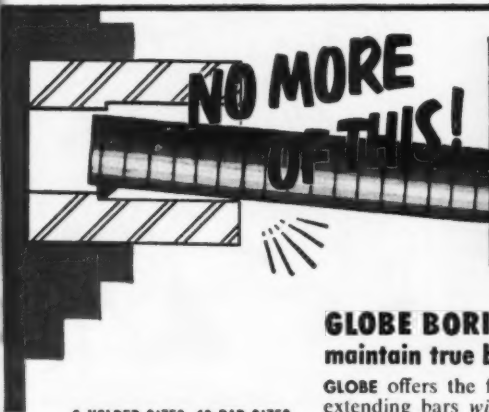
The automatic loader receives valves from a conveyor, carries them on an inclined rack and inserts them, one at a time, in the headstock. Hydraulic clamping is used in the headstock to position and hold the valve during the face grinding operation.

The grinding wheel base and loader are synchronized in a timed cycle. After the valve is loaded in the headstock, the wheel base advances rapidly to grinding position, proceeds with slow continuous grinding feed to a pre-determined size, sparks out and retracts to the back position.

After grinding, the valves are automatically ejected to a chute where they can be put on another conveyor or collected in a box.



An automatic wheel dressing mechanism is used to dress the wheel after a pre-determined number of valves have been ground. A compensat-



6 HOLDER SIZES, 12 BAR SIZES

Write for literature or order
through your dealer!

★ **GLOBE** ★
HEAT-SEAL, INC.
MACHINE TOOL DIVISION



GLOBE BORING BAR HOLDERS maintain true bore alignment

GLOBE offers the facility of changing boring sizes or extending bars *without unclamping the holder*. Once set, true alignment of bar with bore is positively maintained no matter how often the bar set-up is altered! **GLOBE'S** exclusive, independent clamps on Bar and Body provide the answer!

GLOBE also gives you Self-Centering of Cutter Bits, Calibrated Boring Bars, Less Chatter . . . **ALL for LESS MONEY!**

3381 Robertson Boulevard, Los Angeles 34, California

ing feed advances the wheel to take care of the reduction in wheel size. During the dressing cycle, the reciprocating wheel mechanism disengages automatically.

The grinding wheel is 24" in diameter and is driven by a 7½ h.p. motor. Microsphere bearings are used for both the headstock and wheel spindle.

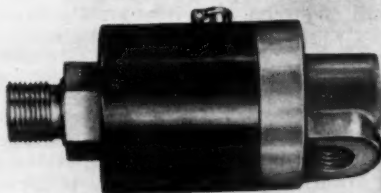
Air union provides balanced sealing

A new rotating air union, the Model 1105, featuring a new method of balanced sealing and easy maintenance has been introduced by the Deublin Company, 1155 Waukegan Road, Glenview, Ill. The balanced sealing feature prevents line pressures from increasing the load on the sealing faces, minimizes wear, and permits a predetermined low torque. Micro-lapped faces of tool steel and carbon form the leakproof seal.

"Down-time" is virtually eliminated. Simplicity of design and easy assembly permits quick replacement of the seal faces in a matter of minutes. This can

often be done without removing the union from the equipment.

Light but rigid construction results from the use of aluminum housing and end bell. Two sealed-for-life ball bearings plus precision machining give efficient performance at high speeds and also account for the low temperature rise under constant use.



The Model 1105 Deublin Air Union is available in two types: standard shaft mounting type, and the special "in-the-shaft" type which reduces overhang.

ENGINEERED

Live Centers

Standard shanks with Morse tapers carried in stock . . . send us your specifications and blueprints . . . we will see that your job is set up with the right LIVE CENTER

STURDIMATIC

TOOL COMPANY

3907 E. STREET • DETROIT 16, MICH.

High speed metallizing guns

Two new metallizing guns have recently been announced by Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N.Y. The new guns, the Metco Type 4E for machine element work, and the Type 5E for corrosion protection coatings, are said to develop the highest spraying speeds yet available in guns designed for hand-held operation. The new guns provide the nearest thing to automatic operation yet devised, since they incorporate a patented jet siphon principle in the gas head, which automatically compensates for variations in gas pressure as high as 10 lbs., and provides a steady flame which produces uniform coatings at lower cost than previously possible.

The new guns also incorporate automatic control of wire feed which compensates for kinks in the wire, reel stand drag, etc. The Metco Type 4E Gun is designed to spray all wires from 20 B&S gauge to $\frac{1}{8}$ " in any metal—carbon steels, stainless, Monels, etc., at speeds up to 40% faster than previous models

and is expected to cut machine part re-paid and salvage costs as much as 85% to 90%. The Type 5E is stated to be the first gun specifically designed for high



speed spraying of the softer metals, such as zinc and aluminum, for protection of equipment and structures against

SCHERR

LIMITED BUDGET INSPECTION LABORATORY

is a **MUST** for all

PRECISION WORK



A COMPREHENSIVE
SET OF MEASURING
TOOLS AND INSTRUMENTS

providing means for indisputable control
of all precision work.

THICKNESS, DIAMETERS, LENGTHS, PROFILE, SHAPE AND FINISH

— Simple in construction, reasonable in price, and fully reliable for unerring
accuracy and wherever possible independent of the human element of "feel".

SAFEGUARD YOUR PRODUCTION
WRITE FOR DETAILS TO . . .

GEORGE SCHERR CO., Inc.

COMPLETE LINE OF PRECISION INSTRUMENTS

198 LAFAYETTE ST. • NEW YORK 12, N.Y.

corrosion for periods ranging from 20 to 30 years. The 5E Gun sprays $\frac{3}{16}$ " wire and will deposit as much as 55 lbs of zinc per hour, or 15 lbs. of aluminum per hour.

Thomson Nylined bearings



has developed the Nylined Bearing. A typical Nylined Bearing, illustrated above, consists of an outer sleeve of metal and a relatively thin lining of Nylon bearing material. The Nylon liner is retained in the outer sleeve in a manner which will permit it to expand and contract circumferentially around the inner periphery of the outer sleeve. The liner is provided with a

To overcome several limitations which restrict the suitability of plain injection-molded or machined Nylon bearings for many applications, Thomson Industries, Inc., Manhasset, N. Y.,

narrow slot, or compensation gap, which interrupts the circumference. In applications where lubricants can be used, one or more annular grooves are provided on the inside of the outer sleeve to form storage wells for grease or other lubricants which are evenly distributed through the compensation gap.

The Nylined principle eliminates the need for wide clearances which are necessary in plain Nylon bearings to compensate for dimensional changes due to thermal expansion and moisture absorption. Dimensional changes in the liner are taken up by the compensation gap with no appreciable effect on the diameter.

Nylined Bearings are said to present no cold flow or creep problem which makes it inadvisable to press fit plain Nylon bearings, hence they can be rapidly installed by press fit or clamping methods.

There is no danger of seizure due to stress deformation which can distort the bore of most plastic type bearings.

COOLEY HEAT TREATING FURNACES

ELECTRIC BOX TYPE • FLOOR AND BENCH MODELS

For Tools and Small Parts

SHOWN HERE

THE COOLEY FLOOR MODEL
for HARDENING AND TEMPERING



Max. Temp.	Sizes	Price
2000"	12" x 8" x 18"	\$985
	12" x 8" x 24"	to
	12" x 8" x 36"	\$1265

All prices are less controls. Any standard controls available for automatic temperature control.

- With Cooley design, the door is virtually another wall, equally insulated with the others—entire hearth is usable.
- Natural thermal convection.
- Easily removable heating elements.

Brown and Wheelco Control Pyrometers carried in stock—available for all applications.
Free on request: ☐ COMPLETE CATALOG ☐ "SHOP NOTES ON HEAT TREATING"

COOLEY

ELECTRIC MANUFACTURING CORP.
36 SO. SHELBY • INDIANAPOLIS, IND.

THE New



Saves Money and Time

MATHISON DROP-FORGED SELF ALIGNING STRAP-CLAMP

Work pieces are held securely on machine tables, face plates of lathe milling machines, boring mills, planer or punch presses and fixtures. Adjustable and self aligning to permit use on a wide variety of sizes and shapes. 5" Strap-Clamp holds work pieces up to 2" without blocking or shims. 8" size does same up to 3". Write today for full details.

Distributors wanted.

EVERETT SALES CO. 4116 Fourth Avenue
Brooklyn 32, New York

BROACHING

TOOLS and FIXTURES

Complete engineering and manufacturing facilities for your broaching applications. Expert service for sharpening and reconditioning your broaches. Standard keyway broaches in stock.

We invite your inquiries—Send us your part prints for recommendations and quotation.

Dependable, Prompt Service

CONANT
Tool & Engineering Co.

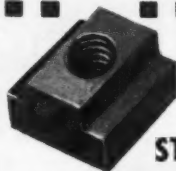
347 WEST 107TH STREET
CHICAGO 28, ILLINOIS



CENTERING MACHINES

Send for Bulletin C-1

THE WHITON MACHINE COMPANY
New London, Conn.



T-NUTS

STUD SETS

STRAP CLAMPS

SURE GRIP STOP BLOCKS

TIETZMANN TOOL CORP.

Englewood, Ohio



MILWAUKEE SURFACE PLATES

THE KEYNOTE TO ACCURATE MEASUREMENT

Over twenty years of experience gives you "proved" performance — added assurance of quality production. Milwaukee Surface Plates, Angles, Parallels and Straight Edges are all made of the highest quality semi-steel and finished to exact dimensions.

WRITE TODAY FOR YOUR FREE CATALOG

J. C. BUSCH COMPANY

Engineers and Machinists Since 1907

165 S. BARCLAY ST. • MILWAUKEE 4, WIS.

Futurmil carbide face mill

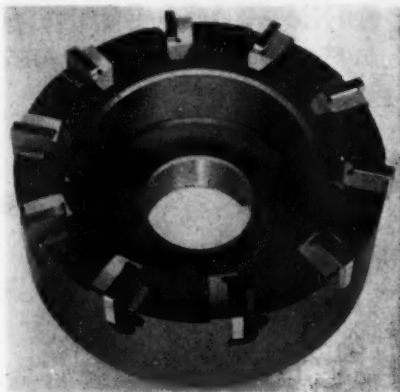
A new type of solid carbide indexable blade face milling cutter has been added to the line of face milling cutters manufactured by Detroit Milling Cutter Co., 28625 Grand River Ave., Farmington, Mich.

This cutter retains the Futurmil principle of multiple production runs without cutter grinding, the solid carbide blades, when dull, being merely indexed to a new cutting edge, since the clearance angles are taken care of by the position of the blade in the cutter body rather than being ground onto the blade.

The blade is square and is furnished in three optional sizes ranging from 1" to $\frac{3}{4}$ " depending on the depth of cut desired. The blades can be indexed or substituted without removing the cutter from the milling machine spindle, a feature of importance where cutter grinding facilities are inadequate or machining difficulties cause any type of cutter to dull quickly. The blade can be indexed eight times before regrinding,

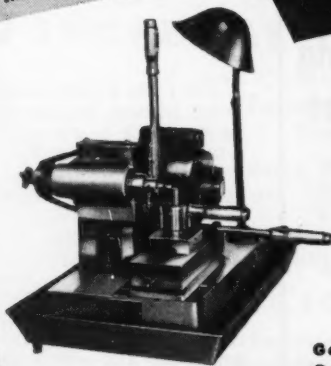
which is then done on a gang set-up on a surface grinder.

The cutter is being widely used for machining of tank hulls and compo-



nent parts. It is also recommended for milling cast armor plate and similar difficult steel machining jobs.

**SIMPLE TOOLING CHANGES
CONVERT SET-UP TO
LATHE, MILL or GRINDER**



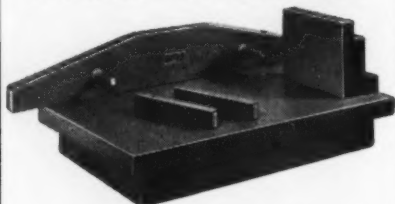
**MILL, TURN or GRIND
with NEW COMBINATION
VIKING LMG 3**

A versatile bench-type machine for small parts manufacture, combination or straight-line operation. 1" ball-bearing spindle, 825 and 3450 rpm., standard speeds (full range optional) 1/3 hp., 1725 rpm. motor.

**Get Complete Information in
Our New Bulletin No. 300.**

VIKING INDUSTRIES 220 MONTAGUE STREET • ROCKFORD, ILLINOIS

A COMPLETE LINE OF
BASIC PRECISION INSPECTION
EQUIPMENT
RAHN BLACK GRANITE
SURFACE PLATES—ANGLE PLATES
PARALLELS—STRAIGHT EDGES



Accuracy to .00005"

*Warp-free, Rust-free, Bump-free,
Extra Hard, Super Smooth!*

FREE TRIAL — WRITE TODAY!

RAHN GRANITE SURFACE PLATE CO.
639 N. WESTERN DAYTON 7, OHIO



Now—
**"JOB-
INDEXED"**
**marking
devices**

Ever notice how difficult it is—
in the average catalog—to find
EXACTLY the right kind of hand
or machine marking device?

New Method's *new catalog* classi-
fies them by the jobs they do...
in easy-to-find fashion.

Get your copy. Ask for Catalog No. NM-51.

NEW METHOD STEEL STAMPS, Inc.
149 Joseph Campau, Detroit 7, U.S.A.

**Wright army type
trolley hoist**

A new addition to the line of Wright Hoists has been announced by the Wright Hoist Division of American Chain & Cable Co., Inc., York, Pa. The Wright Safeway Army Type Trolley Hoist is made in capacities from ½ ton to 3 tons and is available with a special load bar and either a pair of two-wheel plain trolleys or one plain and one geared two-wheel trolley. This hoist was designed for service where a close headroom assembly is required. It is light in weight, and will operate freely around minimum radius curves.



The plain trolley assembly has chilled tread wheels, equipped with New Departure ball bearings, a steel side plate and connections to the load bar. It is adjustable for a wide range of beam sizes, and can be changed from plain to geared or vice versa in a few minutes time, as both the plain and geared mountings are identical.

The geared trolleys are constructed the same as the plain trolley type except that the wheels are furnished with gear rings and pinions having cut teeth, handwheel, hand chain and hand chain guide. Thrust rollers are mounted to insure proper alignment of the assembly whether on straight or curved track.

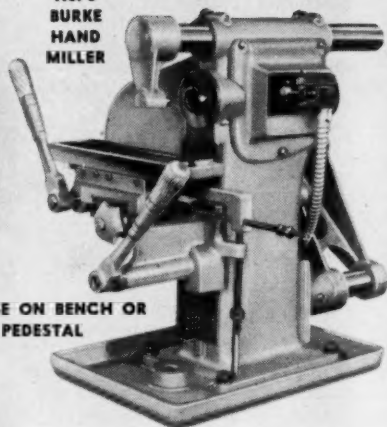
**Rugged! Rigid! Accurate!
Economical!**

**LOW COST OPERATION
HIGH PRODUCTION
MILLING MACHINES**

Send for circular describing
various models of power and
hand feed millers and
attachments.

**The BURKE
MACHINE TOOL CO.**

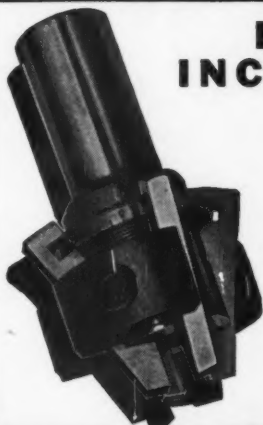
**No. 3
BURKE
HAND
MILLER**



**USE ON BENCH OR
PEDESTAL**

A Division of the U. S. Burke-Machine Tool Co.
20 East 72nd Street Cincinnati 16, Ohio

**KUTMORE ADJUSTABLE
HOLLOW MILLS**



**DESIGNED TO . . .
INCREASE PRODUCTION**

- Any COMBINATION of . . . Turning . . . Tapering . . . Facing . . . Chamfering . . . Trepanning in ONE PASS.
- Exclusive MICROMETER Adjustment Feature For Rapid Set-Up.
- Cutting Capacities From 1/32" To 2" Dia. in Standard Stock

WRITE FOR CATALOG 20BB

Our Engineering Department Is At Your
Disposal On Your Hollow Mill Problems

CARL WIRTH & SON, INC.

1625 CLINTON AVE. NO.
ROCHESTER 5 N. Y.

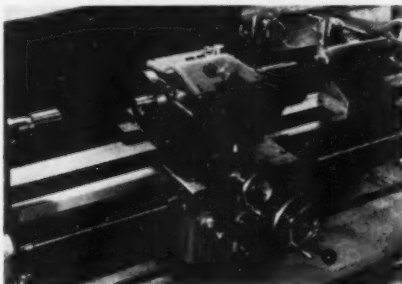
Thread milling attachment

An integrally-powered lead attachment for production threading is said to make possible threads of greater accuracy and better finish at higher speeds. The attachment has been recently introduced by Gubelin International Corp., Swisma Division, 35 W. 53rd St., New York 19, N.Y.

Designed primarily as a work-holding and leading device for multiple-form cutter thread milling on lathes or milling machines, the attachment may also be used to provide the lead for multi-rib wheel thread grinding on plain grinders.

The attachment can be mounted on a lathe cross-slide (see illustration), or a milling machine table. A suitable multi-form thread-milling cutter is mounted in the lathe spindle or milling machine spindle by means of a collet or taper seat, as determined by the cutter shank used. Short work-pieces, to approximately 6" dia. can be mounted in the three-jaw chuck provided with the attachment. Pieces up to 7" dia. or

of irregular contour can be mounted on a face plate which is provided. Long work, up to 2½" dia., will pass through the attachment spindle. Collets, split bushings, and a long-work support are



available for work diameters from 1/32" to 2½". Thread lengths up to the work diameter, or a maximum of 2" can be cut on material to a hardness of Rockwell 40 in 1½ revolutions of the work-piece.

Soft material can be threaded in

THE NEW REVERSIBLE

EXCELSIOR CIRCULAR BENDING MACHINE No. 14-R

ROLLS PART OR COMPLETE
CIRCLES

PRODUCTION CIRCULAR BENDING

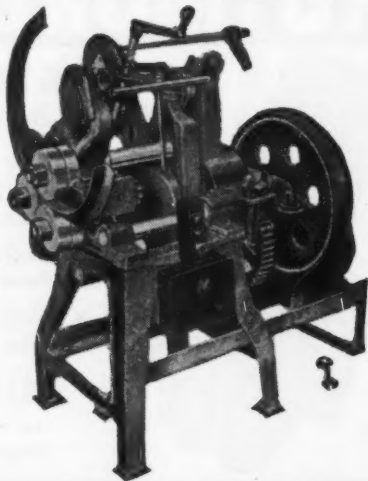
OF
ANGLES, LEG IN OR OUT FLATS, PIPES,
ROUNDS, SQUARES, TEES, CHANNELS

AND
VARIOUS CROSS SECTIONS

FINGER-TIP
PUSH BUTTON

CONTROLS FOR FORWARD, REVERSE
AND INCHING MOVEMENT OF ROLLS
OR STOP

EXCELSIOR TOOL & MACHINE COMPANY, EAST ST. LOUIS, ILLINOIS



THE
UNITED STATES
DEPARTMENT OF
COMMERCE

OFFICE OF THE
COMMISSIONER OF PATENT AND TRADE MARKS

WASHINGTON, D. C.

OFFICE OF THE
COMMISSIONER OF PATENT AND TRADE MARKS

WASHINGTON, D. C.

1917

1917
1918
1919
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
1950
1951
1952
1953
1954
1955
1956
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
2042
2043
2044
2045
2046
2047
2048
2049
2050
2051
2052
2053
2054
2055
2056
2057
2058
2059
2060
2061
2062
2063
2064
2065
2066
2067
2068
2069
2070
2071
2072
2073
2074
2075
2076
2077
2078
2079
2080
2081
2082
2083
2084
2085
2086
2087
2088
2089
2090
2091
2092
2093
2094
2095
2096
2097
2098
2099
2100

THE
UNITED STATES
DEPARTMENT OF
COMMERCE

OFFICE OF THE
COMMISSIONER OF PATENT AND TRADE MARKS

WASHINGTON, D. C.

OFFICE OF THE
COMMISSIONER OF PATENT AND TRADE MARKS

WASHINGTON, D. C.

OFFICE OF THE
COMMISSIONER OF PATENT AND TRADE MARKS

WASHINGTON, D. C.

THE NEW YORK PUBLIC LIBRARY

ASTOR LENOX TILDEN FOUNDATION

500 FIFTH AVENUE

190

lengths to $1\frac{1}{2}$ times the work diameter, or 3" maximum if workpiece is more than 2" dia. Pitch range is from 6 to 40 threads per inch. Multiple threads can be produced without difficulty, provided the lead is no coarser than 6 threads per inch.

The attachment is powered by a 1/30 h.p., 2 speed (750 and 1500 r.p.m.) motor operating at a reduction of 1081 to 1. Any conventional 3-phase voltage is available.

Motor is reversible to provide for cutting left- and right-hand, or internal and external threads. Six spindle speeds are available by various combinations of motor speed and internal gearing, shifted by a lever.

Ball bearing tweezers

The Baker Company, Maplewood, Maine, announces a line of new convenient tools for handling instrument ball bearings during inspection, cleaning and relubricating operations. These new tools are essentially special tweezers for use on bearings having bores from $3/32$ " to $1/2$ ", and can be

furnished in two models—one for gripping the bearing by the inside race and the other for the outer race.



These tools are a useful addition to the company's line of tools for assembling bearings into equipment, and will help avoid the corrosive effects of finger handling of bearings.

NEW!
Adjustable!

Patent No. 2439009

Alternate Reflector Shape

Patented Ball and Socket Joint

"on the spot"

STA-PUT LIGHT

**SPOTLIGHTS VITAL WORKING AREAS
ON MACHINES, TABLES, BENCHES**

- Adjusts to ANY position
- Available with 3, 4, or 5 Ball and Socket joints
- Equipped with round or peribold reflector
- Patented principle keeps light firmly in position
- Enclosed wire insures greater safety
- All moving parts protected from oil, dust and grit
- Can be furnished with porcelain sockets at no extra cost
- Four standard sizes: 29", 32", 36" and 40" overall

Manufacturers' Agents, Write for Particulars

STA-PUT LITE AND EQUIPMENT CORPORATION
1502 S. 44th STREET

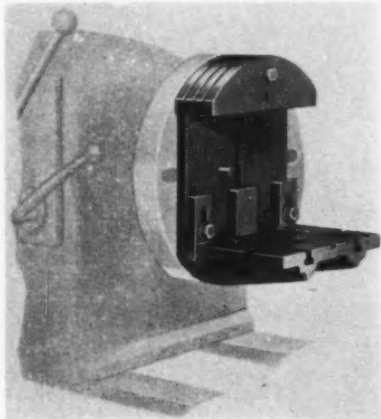
**INSURES THE
SAFETY OF
YOUR WORKERS**

Send for
FREE
Literature

MILWAUKEE 15, WISCONSIN

Curtiss adjustable fixture

An ingenious device which gets more work out of engine lathes is the Curtiss Adjustable Fixture, recently introduced by Curtiss Engineering Co., Harvey, Ill. This unit is stated to have a wide range of efficient use for not only single piece and small production lots, but also medium and large lot production of parts being machined on engine lathes. The fixture accommodates odd-shaped pieces of such shape and design that are not practicable nor possible by ordinary chucking or face plate holding.



The Curtiss Adjustable Fixture bolts securely to the lathe face plate, in which a shallow counterbore has been machined to receive the mounting boss on the rear of the fixture plate, establishing concentricity. The fixture is available in two sizes, No. 16 and No. 24, for 16" or 24" swing engine and turret lathes. The platen of the fixture can be set from center-line, 0" to 4½" on the No. 16, and from 0" to 7½" on the No. 24. Fixtures can also be mounted on lathes of larger swing to increase the off-center setting of the platen to 5½" on the No. 16 or 8½" on the No. 24. The platen size for the 16" model is approximately 12" wide x 8" deep; on the 24" model, platen is 18" wide by about 11" deep.

The work piece and fixture platen can be set accurately on two planes, vertically and horizontally, in relation to

the lathe spindle center line, by scale reading, inside micrometer, Vernier or other means of measurement, assuring quick, accurate set-ups.

This device is machined to "tool room" standards of accuracy to enable first class work to be machined to close tolerances. The curtis fixture offers several opportunities for the practical use of engine lathes as production machines. According to the manufacturer, "one needs to contemplate the use of the fixture for secondary operation work (usually locating the work piece from a previously machined surface) on engine lathes."

This fixture is a standardized tool, the same as a lathe chuck; in view of the current machine tool shortage, the fixture could be of great value in assisting to overcome production bottlenecks.

Cutting tool reconditioning

Manufacturers Cutter Corp., 273 Jefferson Street, Newark 5, N.J. announces the expansion of its facilities in the reconditioning of cutting tools. Special worn out tools with an accuracy previously thought impossible.



This firm has also increased its tool sharpening service facilities by building new and specialized machinery which embodies special measuring devices.

The company has also been engaged in the manufacture of special high speed cutting tools to the customer's blue print specifications, and to micro-projector accuracy. This includes form tools in both high speed and carbide.

The picture above shows a worn out cutter which has been recut on part of its circumference into a standard side mill, while a third of the circumference has been converted into a staggered side mill and another part has been left in its original worn out state, in order to show, for demonstration purposes, that an entirely different new tool can be made from a "useless," worn out cutter.

Edroy binocular eye loupe

The illustration below shows a precision machinist wearing the latest type of Magni-Focuser Binocular Eye Loupe, while at work at a milling machine at the Bell Telephone Laboratories in New York. This precision optical device is made by Edroy Products Co., 480 Lexington Ave., Dept. 14, New York 17, New York. This is one of the many uses for the binocular magnifier at Bell, where many of these loupes serve a variety of purposes in precision work and are well thought of by the opera-



tors. Note that in the above picture the operator has both hands free to work while the Magni-Focuser worn about his head gives him needle-sharp, three-dimensional magnified vision for the precision work he is doing.

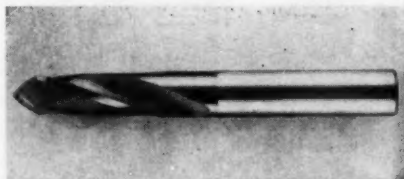
New Raymac carbide drill

A new carbide drill, said to be revolutionary in design and operation, has been developed by the Raymac Manufacturing Co., Inc., 3729 Cass Ave., Detroit 1, Mich.

The Raymac drill's high efficiency is stated to derive from the shape of the flute and the radical way the drill is pointed. The Raymac drill does not fuse through metal, but cuts. This is proven by the chips that are turned out; they are not discolored by heat.

Raymac's drill operates at lower speeds than the ordinary drill. For example, the Raymac $\frac{1}{4}$ " drill, drilling steel of 50-65 Rockwell "C", operates

at its highest efficiency at 350 r.p.m., while a $\frac{1}{2}$ " Raymac drill, drilling the same material, shows its best performance at 200 r.p.m.

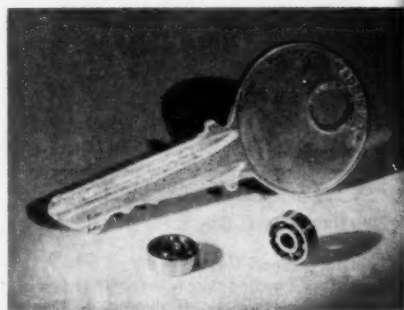


Raymac Carbide Drills are claimed to drill a more accurate and cleaner hole at lower temperatures, with lower speeds plus the advantages of less drill breakage and longer drill point.

Spring-retainer ball bearing

One of the "keys to miniaturization" is the new spring-retainer Micro Ball Bearing, introduced by New Hampshire Ball Bearings, Inc., Peterborough, N. H.

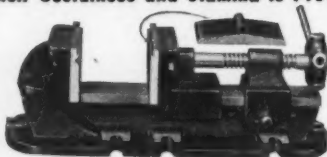
Formerly obtainable only in larger sizes, this new bearing measures $\frac{3}{32}$ " bore x $\frac{5}{16}$ " outside diameter x $\frac{7}{64}$ " wide, in tolerances ABEC 5 and higher. Characteristic of the type are low and uniform values of starting or break-away torque, a high percentage falling



in the range .0006 inch-ounce under a standardized 75 grams thrust load. Individual stainless steel coil springs serve as separators. Rings and balls are standard in high-carbon chrome steel (Cat. R1-5A1) as well as stainless AISI440 (SRI-5A1).

GEM VISES

Their Usefulness and Stamina is Proven



Write for complete information.
J. E. MARTIN MACHINE WORKS
Springfield, Ohio



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature
WATTS BROS. TOOL WORKS
Wilmerding, Pa.



AT LAST! A LOW PRICED DIAL TYPE INDICATOR!

Has 2 contacts $\frac{1}{8}$ " threaded within
 $\frac{1}{8}$ ". Double Faced. Reads front &
back. Two Crystals.
Double faced dial indicator complete
with plated holder including $\frac{1}{8}$ " and
 $\frac{1}{4}$ " contacts—
Black Penrate\$ 6.95
Satin Chrome\$ 7.95
 $\frac{1}{8}$ " Contact, $\frac{1}{2}$ " long
extension75

SUPERIOR INDICATOR CO.
P.O. BOX 734 ROCHESTER, N.Y.

Plug Gages

Ring Gages

Adjustable Snap Gages

Centerless Lapping Machines

Pneumatic Hammers, (Chipping & Rivet-
ing) (Auto Body, sheet metal and Fender)

Hydraulic Jacks (Auto Service and Auto
body)

Re-grinding and re-sizing of plug, Ring and
Adjustable Snap Gages)

JAS. CLARK

139-149 17th Ave., Paterson 3, N. J.

Elox electron tap extractor

A new Elox Electron Drill, (trade mark registered), the M-7 Tapmaster, for the removal of broken taps, drills, reamers and studs at guaranteed record speeds, is a recent development of the Elox Corporation of Michigan, 740 N. Rochester Road, Clawson, Mich. Fast and easy to operate, it has been tested under exacting shop conditions and proven useful in salvaging parts at a fraction of their original cost.



The M-7 Tapmaster employs an "electrode", a hollow copper alloy tubing available in various diameters, which is chucked into the "disintegrating head" and held firmly by a collet. In removing a broken tap or drill, an electrode about half the diameter of the broken tool is used, and the head lowered so the electrode is centered about $\frac{1}{4}$ " above the tap. As the head is fed downward, similar to a drill press, a series of electric arcs cut down between the core and threads of the tap without damage to the threads.

A coolant pumped through the hollow electrode washes away particles of metal. In a through hole, the core can be knocked out as soon as the electrode has cut its way through. In a blind

hole, the core is picked out with a magnetized pick or tweezers. Once the core is removed, the remaining threads can be picked out easily. The same method is used on broken drills.

The M-7 Tapmaster allows 28" of work table clearance and the adjustable drill head may be reversed to give 5 feet of work clearance from the floor. A back break adjusts for corner drilling and drilling holes at any angle up to 45°.

The unit will cut and counterbore any type of steel regardless of its hardness, thickness, shape or size, the manufacturers state. It is used to cut or enlarge keyway slots in cutters, dies, etc., and to repair or alter molds and dies. Its accuracy makes it possible to drill holes from .040" to 1" and larger in hardened dies within .010".

Ford carbide cutter sets

Designed to meet most rotary carbide cutter requirements, four new carbide cutter sets are announced by the M. A. Ford Mfg. Co., Inc., Davenport,



Iowa. Each set is designed to meet a broad range of applications, as it offers from five to twelve shapes suitable for various types of burring, light milling, blending, and finishing. The proper tool is thus always available.

These carbide sets provide economies in production time and tool costs. Use of the proper tool for specific applica-

Air-O-Chek
**The Valve with
the Internal
Fulcrumed
Lever**

Model FA

For Air and Liquids

Model A

Streamlined
Assembly. Air-O-chek
Air Gun and standard
pipe fitting ferruled
to hose.

An invention in value means
Hundreds of thousands are
in use in leading factories,
machine shops and found-
ries. See your jobber or write
direct for full details.

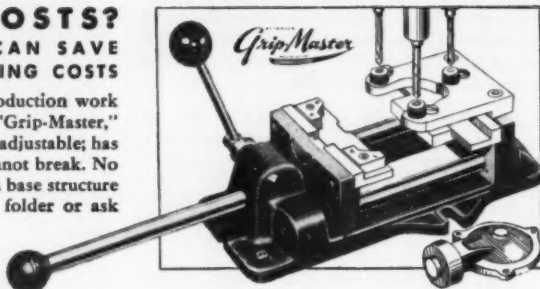
AIR-WAY PUMP & EQUIPMENT CO.
1054 N. Kilbourn Ave. Chicago 51, Ill.

HAVE TO CUT COSTS?

THIS SCREWLESS VISE CAN SAVE YOU UP TO 75% ON TOOLING COSTS

Extra time and labor savings in production work can be yours when you use Heinrich "Grip-Master," the original screwless vise. Instantly adjustable; has positive lock that hammer blows cannot break. No leveling of work necessary. Ideal as a base structure for jigs and fixtures. Write for free folder or ask your Dealer for a demonstration.

NATIONAL MACHINE TOOL CO.
Dept. 101-L • RACINE, WISCONSIN



tions frequently results in savings of as much as one-third in production time, as well as less wear or damage to the tool itself.

These carbide cutter sets are packaged in a plastic container to keep them clean, reduce loss, and for convenience of storage on shelves or in a tool chest. A wood insert holds the tools firmly in place, reducing the possibility of damage; each tool is identified on the package to aid in replacement of individual tools. Tool sizes in the various sets include $\frac{1}{4}$ " bodies on $\frac{1}{4}$ " shanks, $\frac{1}{8}$ " bodies on $\frac{1}{8}$ " shanks, and $\frac{1}{4}$ " bodies on $\frac{1}{8}$ " shanks.

Producto ring punches and dies

The Producto Machine Co., 960 Housatonic Ave., Bridgeport 1, Conn., has introduced a standard line of Ring Piercing Punches and Button Dies for tool and die makers. The Ring design feature takes the place of the conventional punch head, and is said to provide better concentricity, permitting faster delivery from a wide variety of stock sizes.

Niagara circle shear and flanger

The Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y., has announced a new high-speed Circle Shear and Flanger, especially designed for high production of discs and heads, at a minimum tool investment. This device is of interest particularly to manufacturers of tanks, drums, boilers, hot water heaters, metal furniture and other sheet metal products.

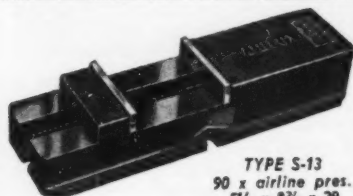
The machine is stated to be well adapted for high production, as well as low or even single quantity production. The set-up can be changed from one size job to another in a very few minutes, and conversion from circle cutting to flanging or vice versa can be accomplished in 20 or 30 minutes at most, the manufacturers claim.

This machine will shear and flange a wide range of diameters and thicknesses of material. No blanking, forming or drawing dies for the many different size heads are required.

As a Circle Shear it cuts at high speed circular discs or circular arcs of

AIRLOX PNEUMATIC VISES

Five senior models. Many special-purpose construction. 50 to 200 times airline pressures. Write for data sheets • Wedge-&-lever action utilizes total cylinder drive. Pat'd. Exceptional rigidity particularly suited to work-holding on CARBIDE MILLING, and almost all milling operations.



TYPE S-13
90 x airline pres.
 $5\frac{1}{4}$ x $8\frac{3}{4}$ x 29
Max. jaw opening 12"

Whitehall, New York

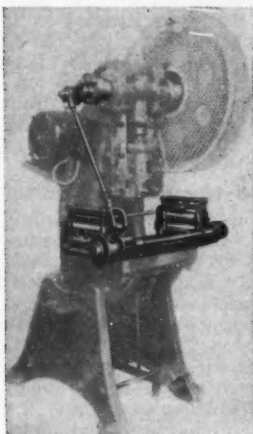
production devices, inc.



$\frac{3}{8}$ " KNUCKLES, 19, 18 & 16 GA.
UP TO 3" OPEN WIDTH.
UP TO 8 FT. LENGTH
WITH OR WITHOUT HOLES.
SHIPPED LOOSE OR ASSEMBLED.



**S & S HINGE AND
METAL PRODUCTS CO.**
4725 IOWA ST.
CHICAGO 51, ILLINOIS



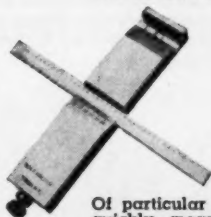
LA BAHN ROLL FEEDS

Reduce punch press operation costs as much as 60% . . . Over 50 models and types of materials—make your punch press an automatic machine by using La Bahn precision roll feeds.

La Bahn Machine & Mfg. Co.

Dept. HJ
Metuchen, N.J.

KOENIG



TWO SEAT VERNIER DEPTH GAUGE

Of particular design, easy and quickly measures distance of projections, depth of holes, etc.

Its features:

- Solid head, hardened ground and lapped.
- Two Verniers, to obtain otherwise difficult measurements.
- Compact design to permit the use of 1" scales.
- Accurate machine divided graduations.

Furnished with case in 1" to 12" size scales — 18" and 24" also available. Prices on application.

No toolroom crib or mechanic can afford to be without one.

WM. A. KOENIG

134 Ferry St.

Troy, N. Y.

Telephone 3362



THE MULTIFORM BENDER

PRODUCES — Springs, Stampings,
Wire Forms, Brackets, Bus Bars,
Clamps, etc. AT A PROFIT.

No Special Tooling

J. A. RICHARDS CO. KALAMAZOO MICHIGAN



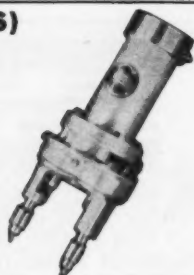
SELLEW (Standard DRILL HEADS)

will greatly increase your drilling output
In stock for immediate delivery.

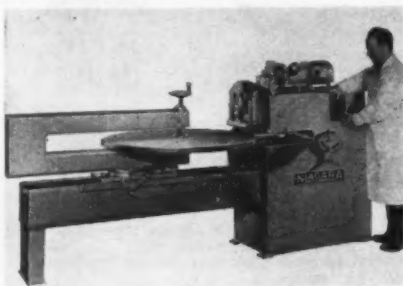
No. OAD min. .65" max. 3.4" — 1/8" drill
No. OD min. .9" max. 4.6" — 1/4" drill
No. 1D min. 1.16" max. 6.33" — No. 1 M.T.
No. 3D min. 2.5" max. 13" — No. 3 M.T.
Heads with fixed spindles designed and built
to customer specifications.

Send Us Your Drilling Requirements

SELLEW MACHINE TOOL CO. Inc. 1910
PAWTUCKET, R.I.



sheet metal up to 8-gage mild steel or 12-gage stainless steel. Discs 8" in diameter to 58" in diameter can be produced from square blanks. Discs as large as 75 1/2" in diameter can be cut from octagonal blanks.



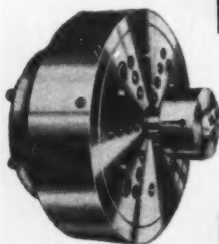
As a Flanger, it turns at high speed smooth, high flanges up to 1 1/2" deep from circular discs. The upper roll is moved down by power with speed adjustable to suit the diameter and thickness of blank. Formed heads are said to be true and round, free from irregularities, and require no further

trimming or finishing for average commercial work. Standard flanging rolls form a radius at the root of the flange of 3/8", which is appropriate for materials within the capacity of the machine. Head diameters ranging from 18 1/2" to 73 1/2" may be flanged with equal ease.

Eutectic high-tensile electrode

A new electrode for cast iron welding, "EutecTrode 26," claimed by the manufacturer to be the first real improvement over conventional ferrous electrodes in the past decade, is announced by Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing, N. Y.

This new electrode, it is reported, differs from conventional ferrous electrodes in that, for the first time, the carbon content in the deposited metal is evenly distributed. The analysis of the metal deposited by new EutecTrode 26 will show a uniform amount of carbon so that the deposited material is similar to a high tensile, high carbon steel, thereby increasing the tensile strength of the weld, it is reported.



SPEEDGRIP — FOR ALL INTERNAL CHUCKING

Here's the answer to fast, accurate and economical machining. SPEEDGRIP CHUCKS are being used in ever increasing quantities in plants everywhere. Write today for information on how SPEEDGRIP can speed your second operation work. Layouts will be made and prices quoted from blueprints. No obligation.

SPEEDGRIP CHUCK INC.

822 N. WARD STREET
ELKHART, INDIANA

Conner TOOL & CUTTER CO.

CONSULTANTS • DESIGNERS • TOOLMAKERS • DRILLERS

DETROIT

Deep Holes—Exclusively

MERCOID

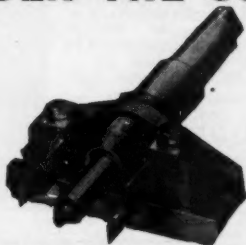
AUTOMATIC CONTROLS
FOR INDUSTRIAL APPLICATIONS
REQUIRING POSITIVE CONTROL
OF PRESSURE. TEMPERATURE,
★ LIQUID LEVEL ETC. ★



★ WRITE FOR CATALOG 700 — PLEASE MENTION THIS PUBLICATION ★

THE MERCOID CORPORATION
4201 BELMONT AVE. CHICAGO 41, ILL.

SOMETHING NEW UNDER THE SUN



Finished holes $1\frac{1}{2}$ " to $11\frac{3}{4}$ " diameter to a depth of 8" in one rapid operation on your present equipment

with

THE BOREMASTER

Not just another Trepanning Cutter but a real heavy duty tool. Stock removed in one piece eliminating waste.

TIME SAVINGS + MATERIAL SAVINGS

= COST SAVINGS

For full details write

KARL A. NEISE

381 Fourth Ave., Dept. BB, New York 16, N.Y.

WALTHAM CYLINDRICAL SUB-PRESSES

Dies for high precision work should not only be perfectly aligned but provision should be made to maintain that alignment throughout the life of the die. Our bulletin shows how it can be done.

WALTHAM MACHINE WORKS WALTHAM 54, MASS.



ARCH SUB-PRESS

DANNEMAN
Precision
DIE-SETS

Precision-Bored
on Master Plates



DANNEMAN DIE-SET DIVISION
ACME-DANNEMAN COMPANY, Inc.
201 Lafayette St. New York 12, N. Y.

CATALOG
ON REQUEST

**KING PORTABLE
BRINELL**

for all HARDNESS
TESTING, Throat 4".
Gap 10", Wt. 27
lbs. — ACCURATE

Puts actual load of
3000 KG on 10 mm. ball.
Test head removable for
testing very large parts.

ANDREW KING
521 Broad Acres Road
Narbeth, Pa.



CAMS

A complete cam cutting service for both large and small cams is offered by our **ROWBOTTOM** and **DALY** cam milling facilities.

May we quote **YOU?**

BLAIR TOOL AND MACHINE CORP.
119-02 15th Ave., College Point, L.I., N.Y.

First in
STAMPINGS
IN SMALL LOTS

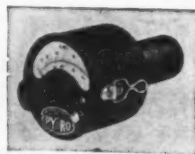


Short Runs
Precision Die Made — Lowest Possible Cost.

DAYTON ROGERS MFG. CO.
Minneapolis 7, Minn.

PYRO Radiation Pyrometer

Determines spot temperatures of heat-treating furnaces, fire boxes, kilns and forgings accurately—instantly. No thermocouples, lead wires or accessories needed. Temperature is recorded on direct-reading dial at press of button. Two double ranges. Write for FREE Cat. No. 100.



The PYROMETER INSTRUMENT Co.
New Plant and Lab., Bergenfield 3, N. J.

SEND FOR FREE CATALOG TODAY



QUARTER TURN SCREWS
SHOULDER SCREWS
DOUBLE END JIG FEET
SCREW TYPE JIG FEET
PRESS TYPE JIG FEET
FLANGED NUTS
CUT THREAD STUDS
TEE-NUTS
COUPLING NUTS
ADJUSTABLE STEP BLOCKS
STAR TYPE HAND KNOBS
HEXAGON TYPE HAND KNOBS
KNURLED HEAD SCREWS

**T-NUT & STUD SETS
STEP BLOCK SETS
PUNCH PRESS SETS**

Northwestern
118 HOLLIER AVE., DAYTON 3, OHIO

"THE ORIGINAL" MAUSER
**MAUSER PRECISION
VERNIER CALIPER**

\$14.75 PPD



MONEY BACK GUARANTEE
FOR MEASURING INSIDE,
OUTSIDE, AND DEPTH.
3 GRADUATIONS
1/1000" — 1/128"
1/10" IN BACK

NEW EXCLUSIVE CAMLOCK AND
GIB IMPROVEMENT INSTANTLY
FIXES SETTING, PREVENTS
SHIFTING, GUARANTEES
SQUARENESS OF JAWS.
THE MAUSER TRADEMARK...
IS YOUR PROTECTION.

GEO. SCHERR CO. INC. 100 LAFAYETTE ST. • N.Y. 12, N.Y.

ATLANTIC GEARS

SPUR
SPIRAL
WORM
BEVEL
GEARS

GENERATED WITH
PRECISION ON
MODERN EQUIPMENT

SEND
SAMPLES OR
BLUEPRINTS
FOR
QUOTATION

**ATLANTIC
GEAR WORKS, INC.**
198 LAFAYETTE ST. • N.Y. 12, N.Y. CA 6-1440



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{1}{8}$ " to 1" diameters. Send for pricelist.

HEIMANN MFG. CO.

332 Lincoln Ave.

Urbana, Ohio

THE BINGHAMTON



4-T SERIES DELUXE

**PORTABLE
FLEXIBLE
SHAFT-GRINDERS**

Sanding
Grinding • Drilling
Polishing
Buffing • Reaming
Burring

4-SPEED

UNIVERSAL-TYPE Fully Ball Bearing

Flexibility and smooth operation make this durable, dependable unit paramount for maintenance or production. Shaft of rubber casing with steel reinforced ends. Write for sizes and prices.

Flexible shafts available for your motors.

SWARTZ & WHITE

486 Chenango, Binghamton, N.Y.

NEED A LIFT?

**GRAND
HYDRAULIC
LIFT
HAND TRUCK**

**FOR
LOADING AND
UNLOADING AT
TRAILER TAILGATE
HEIGHT AND FOR
STACKING DRUMS
AND CASES.**

Lift Stacker
Model 755

Electric drive hydraulic system lifts 750 lbs. up to 55 inches in a few seconds. One man can safely raise and stack heavy loads.

GRAND LIFT STACKER MODEL 755
Pallet or Fork Lift to suit your requirements. Maximum Heights 54" to 94". Uses Standard Auto Battery Built-in Battery Charger. Completely Portable. Low Cost.

Other models include manually operated hydraulic lift hand trucks to suit many lifting, moving, and stacking operations.

**WRITE US OR ASK YOUR LOCAL
MATERIALS HANDLING DEALER**



Manufacturing & Sales Co.

DIVISION OF

GRAND SPECIALTIES COMPANY

3101 W. GRAND AVE., CHICAGO 22, ILL.

SAVE

TIME and MONEY
with

SUPEREAM

STOP-PINS AVAILABLE IN 5 SIZES



FINGER STOPS IN 3 SIZES



STOP-PINS are complete self contained units that hold securely in stripper plate. All sizes have $1/32$ " wall permitting insertion close to die or punch. No threads inside STOPS for springs to catch on. Write for literature and prices.

SUPEREAM FINGER STOPS made in uniform width to fit any standard width slot. Just grind ends to fit.

Write for literature

**TWENTIETH CENTURY
MANUFACTURING CO.**

3726 MONTROSE AVENUE

CHICAGO 18, ILLINOIS



ACROMARK **MAKES—**



A FULL LINE OF
NAME-PLATE
AND PARTS
STAMPING
MACHINES

Write Today
For New Color
Folder & Prices



THE ACROMARK CO.
15 MORRELL ST. ELIZABETH 4, NEW JERSEY



ABRASIVE CENT-R-LAP TOOL

Saves time, eliminates diamond dressing.
Cones changed in seconds. Available in 2
sizes $\frac{3}{8}$ " and $\frac{1}{2}$ " Cent-R-Laps and abrasive
Cones.

Write for descriptive literature and prices.

J. R. Reich Manufacturing Co.
45 E. Stroop Rd. Dayton 9, Ohio

BREMIL
The IMPROVED Compound Lever Shears

ALL ALLOY
FULLY
GUARANTEED



Two Sizes

PORTABLE

No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to $\frac{1}{4}$ " steel plate.

BREMIL MFG. CO.
1720 Pittsburgh Ave., Erie, Pa.

STEVENS ROTARY TABLES
STANDARD AND DIAL TYPES



Table graduated
for single
degree reading.
Precision and
accuracy. Thirty
years' ex-
perience de-
signing circular
attachments.

Write for circular.
Four sizes, two types of each.

JOHN B. STEVENS INC.
486 Canal St. New York 13, N.Y.

CAMS

Our ROWBOTTOM cam cutting
facilities are at your disposal
for your cam requirements.

We solicit your inquiries.

BLOOMFIELD TOOL CORP.
36 FARRAND ST. BLOOMFIELD, N. J.

**READING BENCH
KEYSEATER**



Portable — move di-
rectly to job; a time
saver for both small
and large shops.
 $3\frac{3}{4}$ " stroke; adapt-
able for other work.
Low first cost —
prompt delivery.

Good dealers wanted.

Reading Machine Co.
Reading (Cincinnati) Ohio

Vi-Speed

F R E E T R I A L



AIR-POWERED

VAN PRODUCTS CO.
3734-48 W. 12th Street
Erie, Penna.

**FAST
RUGGED
•
HOLDING
PRESSING
PUNCHING
•
SIMPLE
DESIGN
•
8 MODELS
•
Guaranteed
•
WRITE FOR
CATALOG**

Get a NU-THRED!

The Fast Cutting Thread File

Use Nu-Thread Like a File to Repair
Damaged or Battered Threads on
Bolts, Studs or Axles. Fast!

\$2.00 Each, Post
Paid

**8
THREADS ON
EACH FILE**

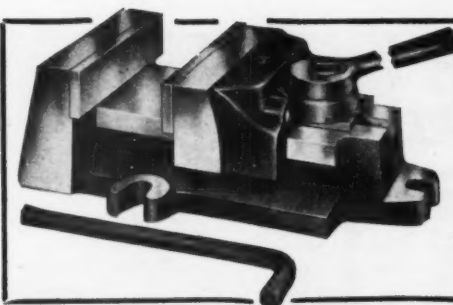
No. 1 For 11, 12, 13, 14
16, 18, 20 and 24

No. 2 For 9, 10, 12, 16
20, 27, 28 and 32

DEALER INQUIRIES INVITED

Order a Pair Today From

BOX 213 KROME Co., Inc. READING PENNA.



PLUNKET QUICK ACTION VISE for DRILL PRESS or MILLING MACHINE

Designed for production work, using an eccentric motion to apply pressure to jaws. Eccentric motion moves jaws 5/16".

Size

Net Price

6" jaws, 1 1/2" deep, opens 4".....\$69.30

Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs.

Our complete line includes Vises for Drill Presses, Milling Machines, Shapers, Grinders

WRITE FOR CATALOG

**J. E. Plunket Machine Co., 1823 W. Lake St.
Chicago 12, Ill.**



**SEE
BETTER**

Keep hands free

CARL ZEISS INC. **2 1/4x HEADBAND MAGNIFIER**

Use of both eyes reveals true depth of details. Magnification of 2 1/4x. Free working distance, 8" to 10", permitting unhindered use of hands. By just lifting your head, your eyes are free for any other activity. Eyeglasses may be worn while using. Highest optical quality. Write for leaflet.

CARL ZEISS, INC.

Dept. H-55-10, 485 5th Ave., N. Y. 17, N. Y.

ANY SPRING IN 60 SECONDS

**NO
LATHE
NECESSARY**



1. 60 second action for a spring 12" long.
2. Ideal for tool room and maintenance shop.
3. Mandrel capacity to 1 1/2".
4. Wire capacity up to .229" diameter.
5. Pitch capacity up to 1"
6. Clamps in your bench vise.

Price \$39

Other small shop sizes from \$20
For 10-Day FREE TRIAL, tear ad out and mail to:

MONTGOMERY & CO., Inc.

Since 1876

55 PARK PLACE, NEW YORK 7, N. Y.



IMPROVE FACING OPERATIONS

M-D Facing Head feeds automatically. Lathe tool bit travels radially, from center outward or reverse. 10 sizes 6" to 46" dia. Write for Bulletin, Prices.

**On Boring
Mills
Drills
Lathes
Millers and
Radials**

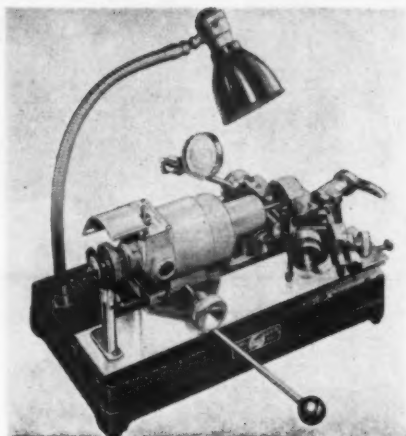
MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.

Dumore twist drill grinder

A new Drill Grinder for 2-lip twist drills, from No. 70 to $\frac{1}{4}$ ", either straight or tapered shank, is announced by The Dumore Company, Dept. J-27, Racine, Wis.

This new tool is said to offer the small drill user considerable economies in increased hole production, lower drill costs, reduction of scrap loss, and improved hole finish and tolerance. Its speed, accuracy, rugged construction and simplicity of operation permit even untrained help to grind drills correctly the first time, freeing foremen and trained operators for more productive work. The machine is so fast that sharpening for an entire shop or department often can be handled by a tool crib apprentice.

With this grinder, the manufacturers claim that the user can quickly and accurately obtain any included angle of drill point from 90° to 160° , and any clear angle from 5° to 15° .



The quick-locking chuck features an infed for finish cuts on fine resharp-ening work, for very small drill sharp-ening, and for extra speed when ex-treme changes in point or clearance angle are required. A combined drill



**Small
END MILLS
THAT
DO A BIG JOB**

MICRO MINIATURES

- **PRECISION
GROUND FROM
SOLID!**
- **FASTER CUTTING!
LONG LIFE!
STRENGTH!**



WE SPECIALIZE IN SMALL SIZES!

WRITE FOR CATALOG

WOODSON TOOL CO.

4811 LENNOX BLVD. INGLEWOOD, CALIF.

CERTIFIED *Aircraft Surplus* **THREAD GAGES**

Plug—Ring—Roll Thread Snap Gages

Plain Plugs—Plain Limit Snap Gages

Discount — 50%—Plug Gages
 30%—Ring Gages
 30%—Roll Thread
 Snap Gages

All gages certified before shipment and sold subject to customer acceptance.

Stock list available upon request.

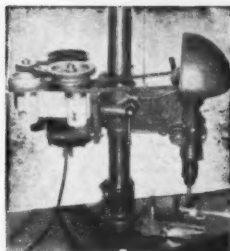
**JOHNSON - FAGG
Engineering Co.**

3920 South Pearl

TULSA, OKLAHOMA

Phone 7-3337

P. O. Box 7157



Write for Details
Dealers Inquiries Invited

NEW! LOW COST! TIME SAVING!

SPEED REDUCER

FOR DRILL PRESSES

- Allows drill head to move freely up and down.
- Speed changes take less than a minute.
- Fits almost any standard motor base up to $\frac{3}{4}$ HP.
- Reduces spindle speed from 1725 RPM to as low as 100 RPM.

Easy to install, the Newman Speed Reducer is a multiple-speed attachment which is valuable wherever drilling, tapping, and reaming are done.

LOUIS NEWMAN MACHINERY COMPANY

8-10 STEARNS SQ.

• **SPRINGFIELD, MASS.**



**SOMMA STANDARD CIRCULAR
FORM TOOLS** Give Maximum
PRODUCTION at Lowest Cost

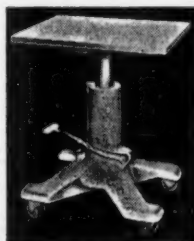
It's no longer necessary or economical to "hand grind" tools or purchase "made to order" tools for short run jobs. Let SOMMA STANDARD CIRCULAR FORM TOOLS give you uniform, correct dimensions, better finish and appearance, less set-up trouble. In short—maximum production at the lowest cost.

SEND FOR LATEST PRICE LIST

SOMMA TOOL COMPANY

20 BROWN ST. WATERBURY, CONN.

PORTABLE ELEVATING TABLE



**Saves
TIME
and
LABOR**

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to $15\frac{1}{2}$ ", leaving operator's hands free. Table swivels and locks in any position.

**SEND TODAY FOR ILLUSTRATED
CATALOG NO. 2**

**MIDWEST TOOL & ENG. CO.
112 WEBSTER ST., DAYTON, OHIO**

USE ECONOMY — DERIVE ECONOMY



**SOCKET HEAD
CAP SCREWS**

**MILLED
FROM BAR**



**HOLLOW
SET SCREWS**

**MADE OF
ALLOY STEEL**



ECONOMY MACHINE PROD. CO., 5207 Lawrence Ave., Chicago 30, Ill.

**SAVE UP TO 85%
ON TOOLS-MACHINERY
AND PARTS!!**

**NEW!
200 PAGE CATALOG**

JUST OFF THE PRESSES! IMMEDIATE DELIVERY! ORDER NOW!!

Our latest and biggest CATALOG of NEW and SURPLUS BARGAINS. Thousands of items at UN-HEARD OF LOW PRICES! SAVINGS UP TO 85% in Hand & Power Tools, Electrical Supplies, Industrial Machinery, Gas and Electric Motors, Winches, Hoists, Machine Tools, Gauges, Welding Equipment, Pneumatic & Air Tools, Raw Stocks, Aluminum, Brass, Copper, & Steel in Sheets, Bar, Rods, Tube & Extrusions, Nuts, Bolts, Rivets, Screws, Wire, Cable and a Huge Stock of HYDRAULIC SUPPLIES including Cylinders, Valves, Pumps, Motors, Fittings, Tubing, etc. While these items last we will continue to sell them at typical low Palley Prices. Write for your copy of this Bargain Packed Catalog TODAY!

PALLEY SPECIALS on HYDRAULIC PUMPS & CYLINDERS



**HYDRAULIC PUMP or MOTOR
GEROTOR TYPE**

Logan Gerotor type. For operating hydraulic systems on trucks, tractors, etc. Delivers 8 GPM at 1200 RPM or 1000 PSI with 5 HP. Can also be used as Hydraulic fluid motor. 3/8" stand pipe ports. 1/2" splined shaft for pulley or direct attachment. 5 1/2" dia., 7" long. Used but condition guaranteed.

1950



P-3 STRATO POWER PUMP
With built-in variable flow control valve in head. Positive displacement piston type. Displacement capacity: 2 gal. per min. at 1500 RPM at 1250 PSI. Pressure limit 1250 PSI continuous. 1400 PSI for 15 sec. Operates at 3750 RPM, intermittent max. 4500 RPM. Rotates either direction without adjustment...

1950



P-4 VICKERS ANGLE PUMP
Positive displacement type, angle piston. Displaces .507 cu. in. per revolution. Has capacity of 6 gal. per min. at 3000 RPM at 1500 PSI., continuous, 1875 for 15 sec. Operating speed of 3750 RPM, intermittent maximum, 4500 RPM. Rotates to the right only.

1949

**PALLEY
SUPPLY CO.**

**DEPT. MTB-11
6321 SAN FERNANDO RD.
GLENDALE 1, CALIF.**

**STATIONARY or PORTABLE
D.C. ARC WELDER**

For light or heavy industrial work. Delivers 300 Amperes, continuous - or 350 to 400 Amperes, intermittent. Designed to weld continuously for hours... This unit is built around a rugged, heavy duty, aircraft type generator and comes complete with Pulley reactor, output controls, Hi-Lo switches & rheostat mounted on sturdy steel frame. Operates on 15 H.P. for maximum output. Gas or electric motor.



9750

**Special! HYDRAULIC
CYLINDER**



Gives 20,000 lb. thrust (push or pull) using 1500 PSI line pressure as obtained from our hydraulic pumps. Will produce up to 40,000 lb. thrust with 3000 PSI. Can also be used on low pressure air systems. 4" bore, 18" stroke; 30 1/2" length. Ideal for road-form - shop machinery.

2995



No. 3 HYDRAULIC CYLINDER
Double action. Bore is 1" - Shaft 1/2". Has stroke of 2 1/2" to 4". Stroke can be adjusted with internal sleeve stops. Overall length is 8 1/2". Will take 1500 lb. continuous duty. 3000 lbs. intermittent. Will lift or push up to 1100 lbs.

575



4 WAY VALVE
Poppet type. Pressure balanced. ON at neutral position. Piston type with built-in relief valves for limit of cylinder strokes. 5/8" AN tube size (7/8"-14 thread) inlet & outlet. Ports to cylinder are 1/2" AN tube size (3/4"-16 thread).

975

Order from this ad. All sales final. All prices F.O.B., Glendale. Pay by M.O. or check. P.O.'s accepted from D.&B. firms. 1/3 deposit with C.O.D.'s.

rest and diamond holder is provided for pregrinding broken drills and dressing rough grinding wheels.

Powered by a 1/5 hp., 115 volt Du-more motor (230 volt can be supplied), the Drill Grinder swings a 2" x 3/8" x 1/4" wheel for sharpening. An identical wheel is mounted on other end of motor armature shaft for rough grinding broken drills to shape, together with a thinner wheel for web thinning. Standard equipment includes one 1/4"-collet; a chuck extension drill holder for No. 52 - 70 drills; a diamond wheel dresser and a set-up gauge.

The appointment of Donald Goodwill to the post of chief engineer is announced by John A. Bradner, president of The Lees-Bradner Company, Cleveland, Ohio, manufacturers of gear hobbing and threading machines.

U. S. Steel Company has announced the appointment of Eugene C. Kennedy as superintendent of its Gary, Indiana, works coke plant, second largest in the world.

THE MARKET PLACE

FOR EMPLOYMENT AND SALES SERVICES

Dovetail, Flat and Circular Form Tools, Reamers, Counterbores

*Prompt, Efficient Service
Attractive Prices*

Send Your Inquiries to —

ANDERSONS, INC.

6603 W. Diversey Ave., Chicago 35, Illinois

MR. JOBBER OR DEALER

Are you looking for a new line which stimulates sales and is profitable? An independent manufacturer of a cutting compound, wants representation for a coolant which has withstood all competition.

write **INSTA COOLANT**

1016 Pawnee St.

Kansas City, Kan.

MACHINE DESIGNER Wanted

M.E. degree desirable. Age 30 to 48. Min. 5 yrs. experience in design of automatic machinery. Must be neat and rapid draftsman. Ohio. (No. 2001).

SCIENTISTS' AND ENGINEERS' ASS'N.

(Placement Agency)

28 Rock Rimmon Rd. Stamford, Conn.

SALES OPPORTUNITY!

Manufacturer's agents wanted to represent fast selling machine tool item, selling to both distributors and industrial users. Increased machine shop activity makes this item a sure-shot sales and profit opportunity.

Wire or write Box 51

c/o **HITCHCOCK PUBLISHING CO.**
WHEATON, ILLINOIS

PRODUCT or PROCESSING ENGINEER Wanted

Young, practical, alert, aggressive, exp'd. machining and assembly on electro-mechanical assemblies, involving mfg. of castings, weldments, fabrication of metal and plastic parts. Check designs for mfg. Broad engineering responsibilities. \$6000 plus. (No. 2051).

Scientists' and Engineers' Ass'n.

(Placement Agency)

28 Rock Rimmon Rd. Stamford, Conn.

PRODUCT DESIGN & DEVELOPMENT ENGINEERS Wanted

Age 25 to 60. Minimum 3 years design experience, preferably in printing, office equipment or business machines. Research, design, develop, organize, execute. \$4180 to \$6396. Ohio. (No. 2024).

Scientists' and Engineers' Ass'n.

(Placement Agency)

28 Rock Rimmon Rd. Stamford, Conn.

TEST ENGINEER Wanted

M.E. or E.E. Age 21 to 40, for automotive chassis testing. \$3000 to \$6000. (No. 2046).

SCIENTISTS' AND ENGINEERS' ASS'N.

(Placement Agency)

28 Rock Rimmon Rd. Stamford, Conn.

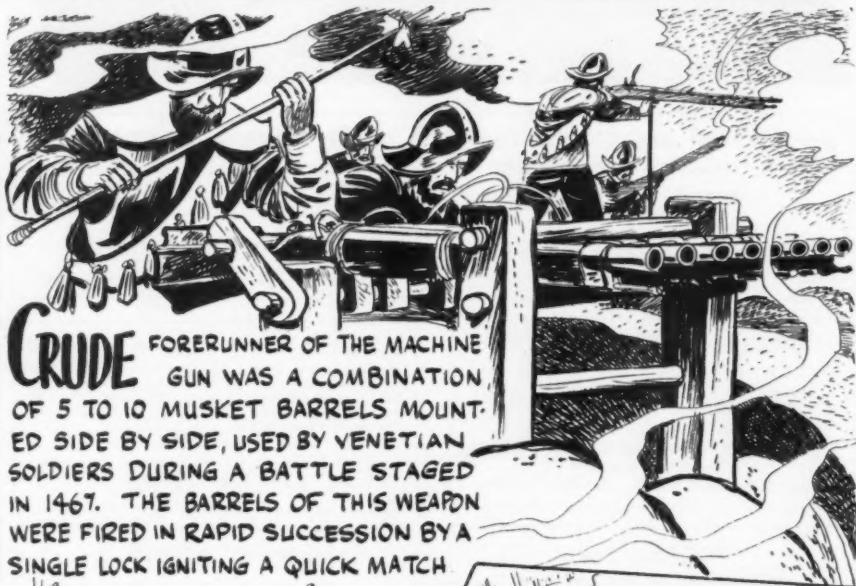
DEALER OR JOBBER

We have a practical, low cost, time-saving Speed Reducer. It is attached to drill presses and saves many man-hours of labor in drilling, tapping, and reaming. New and saleable. Repeat orders coming in. Get details from

LOUIS NEWMAN MACHINERY CO.

8-10 STEARNS SQ. SPRINGFIELD, MASS.

Mechanics Through The Ages



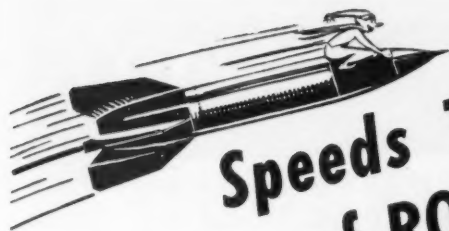
CRUDE FORERUNNER OF THE MACHINE GUN WAS A COMBINATION OF 5 TO 10 MUSKET BARRELS MOUNTED SIDE BY SIDE, USED BY VENETIAN SOLDIERS DURING A BATTLE STAGED IN 1467. THE BARRELS OF THIS WEAPON WERE FIRED IN RAPID SUCCESSION BY A SINGLE LOCK IGNITING A QUICK MATCH.



THE ORE USED BY COLONIAL FURNACES TO MAKE IRON WAS FISHED OUT OF POOL BOTTOMS BY MEANS OF OYSTER RAKES. THE FLUX USUALLY WAS LIMESTONE — OR SEA SHELLS.



People OF THE LATE 1700'S ACTUALLY RESENTED THE EFFORTS JAMES WATT PUT FORTH TO MAKE HIS STEAM ENGINES RUN QUIETLY. THEY WERE INTRIGUED BY THE NOISE AND LIKED THE HORRIBLE CLATTER A WORKING STEAM ENGINE EMITTED!



Speeds **THREADING** of **ROCKET MOTOR!**



5" ROCKET MOTOR — 60 Seconds

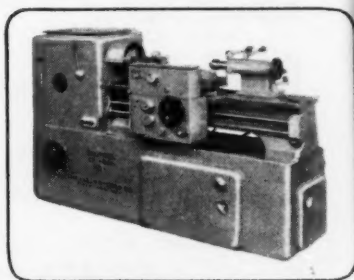
Material SAE X-1025 — 450 RPM
4 1/4" Dia. — 12N — Length 13 1/2"
Single Thread — Tool Kennametal K4H

MAKERS of MILITARY EQUIPMENT

*Parts and
Components*

**ARE ALERT TO CRI-DAN
SINGLE POINT THREADING**

**CHECK THE SPEED, ECONOMY AND
VERSATILITY** of the Cri-Dan Single
Point method of generating threads
against any other method, and you'll
know why so many production men
are going for the Cri-Dan in a big
way. Tool costs average only \$3.20.
Changeover in 15 minutes! Simple
controls enable average worker to
produce precision threads.



Contact your Lees-Bradner representative.

The **LEES-BRADNER** *Company*
CLEVELAND 11, OHIO, U.S.A.

WHATEVER YOU NEED, YOU'LL FIND IT HERE

Abrasive Belt Machines, 71, 152, 243
Abrasive Cloth, Paper, Disc, Belts, Wheels, Stones, Etc., 20, 21, 35, 64, 96, 140, 141, 177
Abrasive Cutting Machines, 136, 137
Accumulators, 48, 49
Adapters, 152, 230
Air Control Equipment, 48, 49, 51, 92, 212, 325
Alloys, 139
Angle Benders, 226, 263, 320
Angles, 305, 316, 318
Anti-Friction Compound, 302
Arbors, 133, 147, 230

Rackrests, Roller, 74
Bags, Shipping, 82
Balancing Machines, 128A, 128B, 128C, 128D
Balancing Ways, 268
Band Tools, 27, 31
Bar Feeds, 76
Bar Machines, Automatic, 24, 25
Bases, Index, 56
Bases, Magnetic, 306
Bearings, Ball, 18
Belt Sanders, 71, 172, 173
Belts, V., 235
Bending Equipment, 102, 206, 226, 263, 278, 320, 327
Bits, Tool, 133, 180
Blades, Work Rest, 255
Blowers, Pressure, 217
Bolts, Machine, 221
Bolts, Coupling, 280
Boots, 139, 282
Boosters, 48, 49
Boring Bar Holders, 312
Boring Bars and Tools, 28, 81, 95, 151, 203, 231, 303, 312, 329
Boring, Drilling & Milling Machines, 163
Boring Heads, 151, 182, 237
Boring Machines, 163, 298
Boring Mills, 163
Bottoming Tools, 231
Box Tools, 180
Brakes, Press and Bending, 11, 102, 236, 278
Broaching Attachments, 316
Broaching Machines, 8, 9
Buffing Machines, 63, 331, 352
Burs, Carbide, 209
Bushings, Drill Jig, 134, 142, 275, 292, 294
Bushings, Rotary, 210

Calipers, 330
Cam Milling Service, 276, 330, 332
Cams, 330, 332
Carbide Tools, 15, 52, 74, 81, 139, 143, 146, 179, 175, 209, 231, 237, 255, 307
Center Drills, 133, 204
Centering Machines, 201, 316
Centers, Live, 211, 242, 277, 292, 313
Centrifuges, 24, 25
Chain Making Machinery, 269
Chains and Sprockets, 18
Chamfering Tools, 319
Chasers, 24, 25
Checking Equipment, 268
Chip Breakers, Drill, 65
Chucking Machines, 24, 25, 298
Chucks, 3, 23, 54, 59, 124, 284, 311, 328
Chucks, Boring, 203
Chucks, Collet, 54, 124
Chucks, Diaphragm, 250
Chucks, Drill, 10
Chucks, Lathe, 23, 54, 284, 328
Chucks, Magnetic, 23, 115
Circle Shearing Machines, 148, 149
Clamps, 29, 38, 316
Clamps, Jaw, 29
Clamps, Strap, 316
Clamps, Toggle, 38
Clutches, 76, 185, 265, 343
Coated Abrasives, 14
Collet Tubes, 75
Collets, 3, 59, 75, 277

Comparators, Optical, 213, 304
Contract Work, 24, 25, 316, 323, 329
Controls, Magnetic Chuck, 44
Copying Equipment, Blueprints, etc., 218
Counterbores, 133, 143, 243
Countersinks, 209
Couplings, 18, 51, 265
Cut-off Machines, 50, 85, 102, 132, 136, 137, 266

Cut-off Wheels, 20, 21
Cutter Sharpening Machines, 8, 9
Cutter Blades, 15
Cutters, Rod, 266
Cutters, Rotary, 215
Cutting Fluid and Oils, 8, 9, 179, 200
Cutting Tools, 22, 66, 68, 69, 116, 117, 133, 170, 180, 204, 215, 291, 349
Cylinders, Hydraulic and Pneumatic, 48, 49, 336

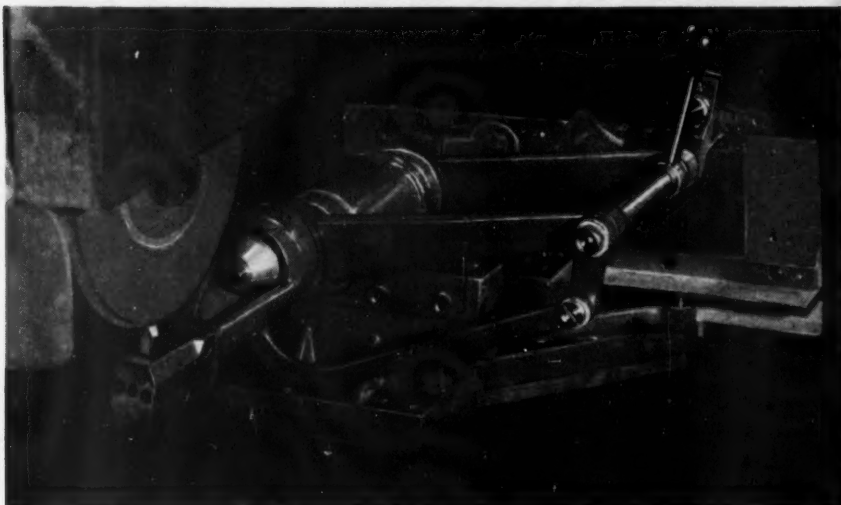
Deburring Machines and Tools, 209
Demagnetizers, 23, 182
Depth Gages, 327
Dial Indicators, 324
Diamond Holders, 249
Diamond Powder, 214, 223, 293
Diamond Tools, 70, 223, 240, 293, 299
Diamond Wheels, 310
Diamonds, Industrial, 223, 293
Die Finishing Specialties, 96
Die Heads, 59
Die Making Machines, 181, 221
Die Polishers, 130
Die Presses, 329
Die Sets, 19, 330
Dies, 19, 40, 41, 43
Dies, Embossing, 43, 299
Dies, Marking, 194
Dies, Roller, 299
Dies, Sheet Metal, 40, 41
Dies, Stamping, 43
Dies, Threading, 24, 25
Discs, Grinding, 33, 96, 177
Dividing Heads, 23
Dowel Pins, 77, Inside Back Cover
Draw Bars, 277
Dressers, Tool, 223
Dressing Fixtures, Grinding Wheel, 29, 203, 341
Drill Chip Breakers, 65
Drill Heads, 65, 155, 229, 328
Drill Heads, Multiple Spindle, 10, 65, 155, 197, 223, 229, 309, 328
Drill Turrets, 13
Drilling Attachments, 13, 28, 65, 197, 262
Drilling Machines, Bench, 198
Drilling Machines, Radial, 86
Drilling Machines, Sensitive, 272
Drilling Machines, Upright, 55, 86
Drilling and Tapping Units, 55, 125, 130, 197
Drilling Units, Automatic, 196, 219, 248, 272
Drills, 196
Drills, Carbide-tipped, 175
Drills, High Speed, 196, 345
Drills, Twist, 81, 177, 291, 305
Drives, Motor, 235, 256
Duplicating Equipment, Blueprints, etc., 218
Duplicating Machines, 101
Dust Control Equipment, 32, 183, 237, 352

Elevators, Portable, 109, 273, 335
End Mills, 68, 81, 133, 143, 291
Engravers, 233
Engraving Tools, 57, 223
Etchers, 182
Extractors, Tap, 192

Facing Tools, 231, 243, 303, 333
Files, 68, 69, 150, 209, 332
Files, Rotary, 81, 209
Files, Thread, 332
Filing Machines, 181, 221, 272, 298
Films, 146
Filters, Air, 51
Finger Stops, 331

MAGNI-FORM*

CONTOUR WHEEL DRESSER



*Trade Mark

UNIVERSAL CONTOUR WHEEL
DRESSER, MODEL KB 11, 1"

- MAGNI-FORM UNIVERSAL CONTOUR WHEEL DRESSER for all types of horizontal spindle surface grinders for 1" or 2" wide wheels.
- MAGNI-FORM CONTOUR WHEEL DRESSER for AUTOMATIC precision dressing of GEAR and SPLINE PROFILES, THREAD FORMS, GAS TURBINE BUCKET ROOT FORMS, etc., for production form grinding.
- MAGNI-FORM UNIVERSAL CONTOUR WHEEL DRESSER for CYLINDRICAL GRINDERS for 1" or 2" wide wheels.
- Special automatic and universal contour dressers developed and built for special requirements.

LITERATURE ON REQUEST

Hoglund Engineering & Manufacturing Co., Inc.

340 SNYDER AVENUE, BERKELEY HEIGHTS, NEW JERSEY

Fixtures, Adjustable, 349
 Flame Hardening Machines, 8, 9
 Flanging Machines, 148, 149
 Flexible Shaft Equipment, 191
 Flexible Shaft Machines, 57, 216, 331
 Floats, Welded, 271
 Flute Millers, 239
 Forgings, 40, 41
 Form Tools, Circular, 335
 Fume Control Equipment, 217
 Furnaces, Heat Treating, 34, 111, 112, 113, 114, 269, 283, 290, 315
 Gage Blocks, 52
 Gage Supplies, 27, 31
 Gages, Air, 2
 Gages, Automatic, 2
 Gages, Carbide, 52
 Gages, Dial, 2, 166
 Gages, Dimensional, 2, 6, 294
 Gages, Electronic, 2
 Gages, Pin, 6
 Gages, Plug, 52, 324, 334
 Gages, Precision, 250
 Gages, Snap, 166, 324, 334
 Gages, Thread, 166, 334
 Gang Slitting Lines, 154
 Gear Checkers, 30
 Gear Grinders, 293
 Gear Measuring Equipment, 52
 Gear Shapers, 186, 187
 Gear Trains, 240
 Gears, 18, 240, 330
 Gears, Helical, 18, 240
 Gears, Spiral, 330
 Gears, Spur, 18, 240, 330
 Grinders, Abrasive Band, 71, 152, 243
 Grinders, Air, Portable, 63, 285
 Grinders, Bench, 71, 165
 Grinders, Carbide Tool, 146, 165, 224
 Grinders, Centerless, 8, 9, 71
 Grinders, Centertype, 8, 9
 Grinders, Contour, 27, 31, 71
 Grinders, Cylindrical, 169, 224
 Grinders, Drill, 163, 181, 184
 Grinders, External or Internal, 224
 Grinders, Face Mill, 181
 Grinders, Flute, 239, 300
 Grinders, Flat, 71
 Grinders, Pedestal, 169, 195, 241
 Grinders, Portable Electric, 57, 172, 173, 352
 Grinders, Profile, 8, 9
 Grinders, Radial Relief, 236
 Grinders, Surface, 27, 31, 161, 169, 177, 224
 Grinders, Tap, 300
 Grinders, Template Tool, 181
 Grinders, Tool & Cutter, 142, 163, 165, 181, 195, 241
 Grinders, Valve, 293
 Grinding Fixtures, 59, 170, 262, 317
 Grinding Spindles, 12
 Grinding Wheel Forming Attachment, 170
 Grinding Wheels, 20, 21, 64, 140, 141
 Grooving Tools, 67
 Hammers, Pneumatic, 324
 Handles, Machine, 310
 Hardness Testing Equipment, 293, 330, Back Cover
 Hinges, 310, 327
 Hoists, Air, 48, 49
 Hole Finishing Tools, 324
 Hole Saws, 60
 Honing Machines, 7
 Honing Tools and Fixtures, 7
 Hopper Feeds, 310
 Hose Assemblies, 51
 Hydraulic Equipment, 336
 Index Fixtures and Tools, 10, 56
 Indicators, Precision, 324
 Inspection & Measuring Devices, 232, 314, 330
 Jig Bore, 264
 Jig Boring Attachments, 28, 262
 Jig Boring Services, 276
 Jig Feet, Double End and Screw Type, 330
 Jigs and Fixtures, 40, 41, 55, 136, 187, 250, 262, 249
 Joints, Universal, 18

Keys, Machine and Woodruff, 274
 Keyseaters, 180, 332
 Keyway Cutting Equipment, 53, 133, 204, 316
 Knobs, Machine, 310, 330
 Knurling Tools, 74, 292
 Lapping Equipment & Compounds, 214, 281
 Lapping Machines, 8, 9, 171, 324
 Lapping Tools, 332
 Lathe Attachments, 53, 244, 262, 277, 306, 317, 333, 349
 Lathe Center Lubricant, 267, 308
 Lathes, Automatic, 35, 98, 126, 127, 128A, 128B, 128C, 128D
 Lathes, Bench, 188
 Lathes, Engine & Toolroom, 39, 42, 83, 90, 91, 126, 127, 156, 163, 188, 203, 260, 298
 Lathes, Gap, 83, 90, 91, 203
 Lathes, Precision, 42, 83, 126, 127, 188
 Lathes, Speed, 168, 239
 Lathes, Turret, 35, 45, 46, 128A, 128B, 128C, 128D, 188, 301
 Layout Fluid, 27, 264, 266
 Lift Trucks, 331
 Light Wave Equipment, 52
 Lighting Equipment, 321
 Lubricants, 267, 308
 Lubricators, 51
 Machine Parts, 274
 Magnetic Bases, 306
 Magnifiers, Binocular, 220, 333
 Mandrels, Expanding, 271
 Mandrels, Lathe, 132, 204
 Marking Machines, 43, 61, 302, 332
 Marking Tags, 88
 Marking Tools, 43, 194, 290, 302, 318
 Materials Handling Equipment, 109, 273, 331
 Micromills, 334
 Microscopes, Pocket, 249
 Milling Cutters, 15, 22, 59, 84, 133, 143, 305, 319, 334
 Milling Machine Attachments, 28, 53, 56, 147, 170, 317, 333
 Milling Machines, 1, 8, 9, 131, 133, 147, 163, 256, 298, 319
 Milling Machines, Bench, 319
 Milling Machines, Contour, 110
 Milling Machines, Hand, 319
 Milling Machines, Horizontal, 84
 Milling Machines, Knee-type, 123
 Milling Machines, Twin, 121
 Milling Machines, Vertical, 84, 123
 Motors, Air, 32
 Motors, Electric, 47, 336
 Mounted Wheels, 20, 21, 64, 96
 Name-Plate Stamping Machines, 302, 332
 Nibbling Machines, 193
 Notching Equipment, 102, 255
 Numbering Heads, 43
 Nut Runners, 172, 173
 Nut Tappers, 55
 Nuts, Coupling and Flanged, 330
 Oilers, Stock, 270
 Optical Inspection Devices, 213, 220, 249, 304, 314, 333
 Pantographs, 101
 Parallels, 240, 316, 318
 Pillow Blocks, 18, 268
 Pins, Groove, 274
 Pipe Bending Machines, 206, 263
 Pipe Notchers, 255
 Pivot Punches, 199
 Planers, 163
 Plates, Surface, 80, 305, 316
 Plates, Surface, Granite, 318
 Plugs, Pressure, 77
 Pneumatic Tools, 63, 285, 326
 Points, Mounted, 96
 Polishing Tools, 57, 63
 Portable Electric Tools, 57, 172, 173, 350, 352
 Portable Elevators, 109, 273, 335
 Precision Parts, 40, 41, 250, 275

YOUR SAVINGS CONTINUE.

CONWAY CLUTCH

"The Clutch of Robust Refinement"

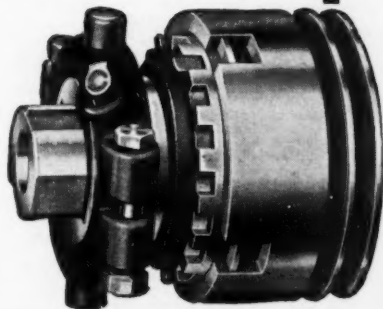
SAVE on every step needed to bring power to your equipment . . . for every step of the way CONWAY CLUTCHES zealously maintain their efficiency. From 1/3 hp to 300 hp there's a CONWAY CLUTCH to do a good job for you.

STANDARDIZED, INTERCHANGEABLE PARTS

Write for NEW BULLETINS

**The CONWAY
CLUTCH Co.**

**1105 Marshall Ave.
Cincinnati 25, Ohio**



Precision Tools, 234
Press Attachments, 197, 205, 327, 335
Press Speed Reducers, 335
Presses, Air, 254
Presses, Arbor, 222, 254, 271
Presses, Bench Radial Drill, 351
Presses, Deep Throat, 287
Presses, Drill, 55, 136, 137, 163, 188, 222, 298
Presses, Foot, 269
Presses, Horn, 287, 289
Presses, Hydraulic, 148, 149, 176, 268
Presses, O.B.I., 134, 247, 295
Presses, Power, 134, 269, 298, 347
Presses, Punch, 287, 289, 295, 347
Presses, Straightening, 268
Profiling Machines, 110
Pulleys, Variable Speed, 235
Pumps, Air, 32
Pumps, Coolant & Lubricant, 62
Pumps, Hydraulic, 336
Punch Press Sets, 330
Punches, 199, 280
Punches and Dies, 40, 41
Punches, Bench, 102
Pusher Tubes, 75
Pyrometers, 330

Racks, 265
Radius Tools, 29, 236
Rasps, 269
Reamer Holders, 135
Reamers, 81, 116, 117, 133, 143, 177, 201, 291, 305
Recessing Tools, 74
Rectifiers, 23, 41
Reels, Stock, 247, 269
Regulators, 51
Representatives Wanted, 337
Retaining Rings, 67
Riveting Machines, 274
Rod Parters, 102
Roll Feeds, 247, 327
Roll Forming Machines, 151, 205
Roller Backrests, 74

Safety Devices, 205
Safety Tags, 88
Sand Blasts, 32
Sanders, Flexible Shaft, 331
Sanders, Portable, 63, 172, 173
Saw Blades, Hack, Inside Front Cover, 27, 31, 37, 50, 68, 69, 78, 190, 238
Saw Blades, Hack, Inside Front Cover, 68, 69, 238
Sawing Machines, Band, Inside Front Cover, 27, 31, 37, 167, 272
Sawing Machines, Circular, 256
Sawing Machines, Cut-off, 85, 132, 256
Sawing Machines, Hack, Inside Front Cover, 23, 222, 347
Sawing Machines, Mitre, 155
Saws, Circular, 68, 69, 215
Saws, Hole, 60
Scaling Tools, 58
Scrapers, Hand and Power, 268
Screw Drivers, Power, 172, 173, 310
Screw Machine Tools, 74, 76, 180
Screw Machines, Automatic, 24, 25, 35, 256, 298
Screws, Cap, Set, Socket & Machine, 40, 41, 77, 280, 330, 335, Inside Back Cover
Segments, Abrasive, 64
Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 116, 117, 240, 245, 276, 282, 299, 316, 329, 330, 349
Set-Up Equipment, 72, 244, 249, 309, 317
Shapers, 11, 36, 39, 297, 298, 347
Shapers, Bench, 188
Shearing Machines, 11, 102, 148, 149, 288
Shears, Hand, 332
Shears, Squaring, 68, 69
Sheet Metal Machinery, 148, 149, 154
Sine Plates, 232
Slide Forming Machines, 269
Slip Roll Forming Machines, 205
Slitting Cutters, 133
Slitting Machinery, 288

Slotters, 163
Solenoids, 24, 25
Spacers, Arbor, 230
Special Machinery, 128A, 128B, 128C, 128D, 130, 163, 256
Special Tools, 133, 143, 230, 291, 349
Speed Reducers, 335
Spindles, 12, 159
Spot Facers, 135, 243
Spotters, 288
Spring Winders, 333
Stacking Machines, 272
Stampings, 330
Stamps, Steel, 43, 194, 299, 318
Steel and Steel Stock, 27, 31, 68, 69, 104, 118
Step Blocks, 339
Stock Pushers, 75
Stones, Sharpening, 14
Stops, Lathe, 316
Stop Pins, 331
Stops, Revolving, 74
Straight Edges, 316
Structurals, 104, 118
Stud Extractors, 192
Stud Sets, 330
Stud Setters, 59
Studs, 280, 330
Sub-Presses, 329
Superfinishers, 128A, 128B, 128C, 128D
Swing Tools, 180
Switches, Control and Limit, 24, 25
Switches, Demagnetizing, 23

Tables, Elevating, 335
Tables, Rotary & Index, 296, 332
Tap Chucks, 10
Tap Heads, 10, 55, 65, 70
Tap Holders, 74, 79, 135
Taper Attachments, 319
Taper Pins, 274
Tapes, Steel, 14, 234
Tapping Attachments, 10, 65, 79, 155
Tapping Machines, 10, 35, 65, 79, 125, 279
Taps, 16, 17, 133, 153, 177, 201, 305
Taps Collapsible, 59
Thimble, Drill Point, 181
Thread Rolling Machines, 24, 25, 130
Threading Machines, 55, 125, 339
Threading Tools, 24, 25, 153, 231, 293, 339
T-Nut and Stud Sets, 316, 330
Tool Designing, 245, 282, 329, 349
Tool Holders, 4, 74, 135, 192, 244
Tool Posts, 74
Tote Pans, 204
Tracer Controlled Equipment, 101, 233
Transfer Screw Sets, 331
Transmissions, 235, 286
Traps, Steam and Air, 271
Triangles, Shop, 52
Tripping Devices, Automatic, 205
Tube & Pipe Bending Machines, 206, 263
Tube & Pipe Forming Equipment, 154
Tube Notching Equipment, 253
Turning Tools, 74, 223
Turret Attachments, 53
Turrets, Drill, 13
Turrets, Lathe and Toolpost, 228, 306
Type Holders, 194

Valves, 51, 92, 212, 227, 271, 325, 336
Verniers, 327, 330
Vise Jaws, 29
Vises, Bench and Machine, 23, 155, 170, 184, 265, 270, 308, 309, 316, 324, 326, 332, 333

Welding Equipment & Supplies, 276, 336
Wheel Dressers, 73, 341
Wheel Dressers, Diamond, 293
Wheels, Hand, 310
Wire Cutters, 266
Wire Forming Machines, 269, 327
Wire Straightening Machines, 269
Wires, Measuring, 52
Work Locators, 323
Worms, 240, 330
Wrenches, Torque, 286

EXTRA LONG LENGTH HIGH SPEED DRILLS IMMEDIATE DELIVERY

Straight Shank No. 1 - 60

No. By Gage	Length Inches	Our Price Net Each
1 to 10	6¼	\$1.00
11 to 20	5¾	.90
21 to 30	5¾	.80
31 to 40	5¼	.70
41 to 50	4½	.60
51 to 60	3½	.50

Size Inches	Length Overall Inches	Length Flute Inches	Price Each Net
13/32	12	9	\$3.05
27/64	12	9	3.30
7/16	12	9	3.30
29/64	12	9	3.60
15/32	12	9	3.60
31/64	12	9	3.60
1/2	12	9	3.60

Straight Shank

Size Inches	Length Overall Inches	Length Flute Inches	Price Each Net
1/8	12	9	\$1.65
9/64	12	9	1.65
5/32	12	9	1.65
11/64	12	9	1.65
3/16	12	9	1.65
13/64	12	9	1.76
7/32	12	9	1.76
15/64	12	9	1.95
1/4	12	9	1.95
17/64	12	9	2.05
9/32	12	9	2.05
19/64	12	9	2.25
5/16	12	9	2.25
21/64	12	9	2.50
11/32	12	9	2.50
23/64	12	9	2.75
3/8	12	9	2.75
25/64	12	9	3.05

Taper Shank

17/32	15	12	\$ 7.15
9/16	15	12	7.70
19/32	15	12	8.25
5/8	15	12	8.80
21/32	15	12	9.00
11/16	15	12	9.10
23/32	15	12	9.35
3/4	15	12	9.50
25/32	15	21	10.50
13/16	15	12	12.00
27/32	15	12	12.65
7/8	15	12	13.20
29/32	15	12	13.75
15/16	15	12	14.30
31/32	15	12	15.40
1	20	15	17.60
1- 1/16	20	15	18.70
1- 1/8	20	15	19.80
1- 3/16	20	15	22.00
1- 1/4	20	15	24.00

VICTOR MACHINERY EXCHANGE, INC.

251 Centre St. Phone: CAnal 6-5575 New York 13, N. Y.

Index to Advertisers

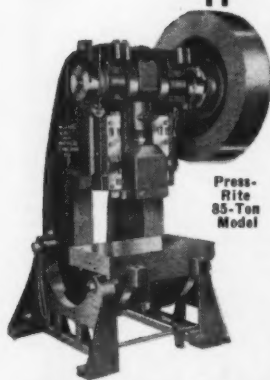
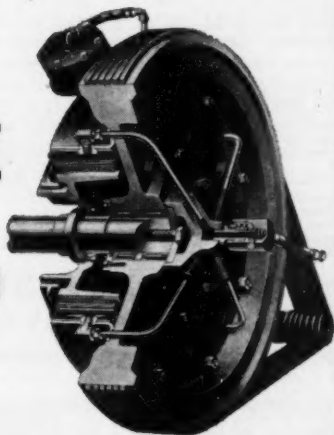
A	
Ace Abrasive Laboratories	214
Acme-Danneman Company, Inc.	330
Acme Industrial Company	275
Acme Tool Company	244
Acromark Company	332
Adamas-Carbide Corp.	307
Aget-Detroit Company	237
Air-Mite	254
Air-Way Pump and Equipment Company	325
Allan Manufacturing Company	292
Allen Collet Manufacturing Company, Inc.	75
Allen Manufacturing Co.	Inside Back Cover
Allied Mfg. and Sales Div. (Grand Specialties Co.)	331
Allied Products Corp.	40-41
Allison Chuck Products	124
American Chain & Cable (Campbell Div.)	193
American Chain & Cable (Wilson Mechanical Instrument Div.)	Back Cover
American Photocopy Equipment Co.	218
Anderson Brothers Manufacturing Company	268
Andersons, Inc.	337
Armstrong-Blum Manufacturing Company	Inside Front Cover
Armstrong Brothers Tool Company	4
Arter Grinding Mach. Co.	224
Atlantic Gear Works	330
Atlantic Saw Mfg. Co., Inc.	78
Atrax Co.	81
Auto Moulding & Manufacturing Company	310
Automatic Steel Products, Inc.	125
Automatic Valve Co.	227
B	
Baldor Electric Company	165
Bambrick, Richard J.	298
Barber-Colman Company	116-117
Bath Company, John	16-17
Beaver Gear Works, Inc.	240
Behr-Manning	14
Beily & Co., Charles H.	177
Beverly Shear Manufacturing Company	288
Bicknell-Thomas Co.	243
Black Drill Co.	196
Blair Tool and Machine Corp.	330
Bliss Co., E. W.	282
Bloomfield Tool Corp.	332
Boggis & Co., Henry P.	300
Bokum Tool Co.	231
Roston Gear Works	18
Boyar-Schultz Corp.	221
Bradford Machine Tool Co.	350
Bremil Manufacturing Co.	332
Brown & Sharpe Manufacturing Company	66
Brown Engineering Company	265
Buck Tool Company	54
Burke Machine Tool Co.	319
Busch Company, J. C.	316
C	
Campbell Machine Division (American Chain & Cable)	193
Capitol Machinery Corp.	351
Carboloy Company	146
Carborundum Company	33
Cardinal Machine Co.	308
Challenge Machinery Co.	80
Chandler Tool Company	303
Chicago Quadrill Co.	197
Chicago Wheel & Manufacturing Company	20-21
Cimcof Division (Cincinnati Milling Machine Co.)	179
Cincinnati Bickford Tool Company	86
Cincinnati Electrical Tool Company	352
Cincinnati Milling Machine Company	8-9
Cincinnati Milling Products Division (Cincinnati Milling Machine Company)	179
Cincinnati Shaper Company	11
Clark, James	324
Cleco Division (Red Roller Bit Co.)	58
Cleveland Industrial Tool Corp.	240
Cleveland Tapping Machine Company	125
Clippert Diamond Tool Co.	223
Coffey-Cummins Manufacturing Company	175
Colborne Manufacturing Company	239
Colonial Bushings, Inc.	142
Columbus Die-Tool & Machine Company	282
Combination Vise and Jig Company	309
Commander Manufacturing Company	65
Conant Tool and Engineering Company	316
Conner Tool & Cutter Co.	329
Consolidated Machine Tool Co.	163
Conway Clutch Company	343
Cook and Chick Company	310
Cooley Electric Mfg. Corp.	290-315
Crales Manufacturing Company, C. C.	151
Crozier Machine Tool Co.	228
Criterion Machine Works	237
Curtiss Engineering Co.	349
D	
Danly Machine Specialties, Inc.	19
Davis Keyseater Co.	180
Dayton Rogers Manufacturing Company	26-330
Delaware Tool Steel Corporation	283
Delco Products Division	47
Delta Power Tool Division Rockwell Manufacturing Co.	136-137
Denison Engineering Co.	176
Detroit Stamping Company	38
Detterbeck Co., George	180
Diamond Tool Research Company, Inc.	299
Diehl Machine Works, G. M.	46
Dixon Crucible Company, Inc., Joseph	267
DoAll Company	27-31
Donovan Manufacturing Company	270
Dreitz & Krump Manufacturing Company	278
Dremel Manufacturing Company	57
DuMaurier Co.	246
Durant Tool Supply Company	270
Dykem Company	266
E	
Economy Engineering Co.	273
Economy Machine Products Company	235
Economy Tool & Machine Company	294
Edroy Products Company	220
Eisler Engineering Company, Inc.	276
Electro-Matic Products Co.	44
Electro-Mechano Company	248
Elgin Tool Works	42
Empire Tool Co.	135
Enco Manufacturing Co.	306
Ettec Tool Co.	10
Ex-Cell-O Corp.	159
Excelsior Tool & Machine Company	320
Everett Sales Co.	316
F	
Federal Products Corp.	2
Fellows Gear Shaper Co.	186-187
Flynn Manufacturing Co.	182
Fulfilo Specialties Company	62
Fulmer Company, C. Allen	7
G	
Gallmeyer & Livingston Co.	169
Gateco Rotary Bushing Company	210
General Die and Stamping Company	277
General Engineering and Manufacturing Co.	36
Gillen Company, John	274
Gisholt Machine Company	128A-B-C-D
Globe Heat-Seal, Inc.	312
Golconda Corp.	70
Gorton Machine Company, George	101
Grand Specialties Co. (Allied Mfg. and Sales Div.)	331
Grand Tool and Supply Co.	305
Grant Manufacturing & Machine Company	274
Greenlee Tool Co.	263
Grob Brothers	272
Grobet File Company of America	269



ANOTHER PROVEN PRESS-RITE FEATURE!

... The New
PRESS-RITE

AIRFLEX AIR FRICTION CLUTCH



Press-
Rite
85-Ton
Model

It's the greatest air clutch ever built into a punch press! Incorporated in this new Press-Rite Airflex Clutch is an airflex unit — a proven product of many years. Hundreds of press users report little or no maintenance cost.

CHECK THESE FEATURES:

- No adjustment for wear
- Air and spring safety brake
- Air pressure regulated to suit work
- No worry about excess heat
- Available completely air or electric controlled
- Either push button or foot controls
- Optional equipment for all Press-Rite Presses, 20 to 85 ton capacity

For years airflex unit clutches have taken over where other clutches have failed. Get full details on this and other features of the Press-Rite line, TODAY!

Sales Service Machine Tool Co.



PRESS
RITE
PRESSES



SHAPE
RITE
SHAPERS



KELLER
POWER
HACK SAWS

2357 UNIVERSITY AVENUE
ST. PAUL 4, MINNESOTA

H	
Hamilton Tool Company	166
Hammond Machinery Builders	146-243
Hanson-Whitney Co.	201
Harding Brothers, Inc.	3
Harford Special Machinery Company	130
Harvey Manufacturing Corporation	221
Hayfred Co.	293
Heimann Manufacturing Company	331
High Speed Hammer Company	272
Hoglund Engineering & Supply Co.	341
Hurberg Gage Co.	6
Houston Grinding and Manufacturing Company	242
Howe and Fant, Inc.	13
Hy-Pro Tool Company	153

I	
Index Machine Company	84
Ingersoll Milling Machine Co.	15
Insta-Coolant (James West)	337

J	
J & S Tool Company, Inc.	29
Jacobs Manufacturing Company	311
Jiffy Manufacturing Company	82
Johnson-Fagg Engineering Company	334
Johnson Machine & Press Corp.	295
Johnson Manufacturing Corp.	50

K	
Kalamazoo Tank and Silo Company	167
Kaufman Mfg. Co.	279
Kearney and Trecker Corp.	123
Kempamith Machine Co.	147
Kennametal, Inc.	170
Keo Cutters	204
King, Andrew	330
Knight Machinery Co., W. B.	1
Koenig Co., William A.	327
Krome Co., Inc.	332

L	
L-W Chuck Company	23
L & J Press Corp.	295
Last Word Sales Company	203
Lebahn Machine and Manufacturing Co.	327
LeBlond Machine Tool Co., R. K.	90-91
Lee Company, K. O.	195
Lees-Bradner Company	339
Leiman Brothers, Inc.	32
Lewthwaite Machine Company, T. H.	266
Lindberg Engineering Company	111-112-113-114
Linley Brothers Company	254
Lipe-Rollway Corp.	76
Littell Machine Company, F. J.	212
Locke Gage Co.	219
Logan Engineering Company	39
Lucas and Son, J. L.	204
Lufkin Rule Company	234
Luma Electric Equipment Co.	182

M	
Madison-Kipp Corporation	285
Madison Manufacturing Co.	95
Magic City Machine Tool Company	249
Manufacturers Cutter Corp.	349
Marshalltown Manufacturing Company	289
Martin Machine Works, J. E.	325
Marvel Tool and Machine Company	211
Master Manufacturing Company	53
Maurey Manufacturing Corp.	235
McDonough Manufacturing Co.	184
Mercol Corp.	329
Merkert and Sons	299
Metal Removal Co., W. F.	215
Meyers and Company	264
Michigan Chrome & Chemical Company	223
Michigan Drill Head Company	72-73
Michigan Tool Co.	335
Midwest Tool & Engineering Company	60
Millers Falls Co., Engineering Company	48-49
Miller Motor Co.	59
Modern Tool Works	126-127
Monarch Machine Tool Co.	333
Montgomery & Co.	45-110
Morey Machinery Company	256
Motch & Merryweather Machinery Co., The	333
Mummert-Dixon Company	

N	
National Acme Co.	24-25
National Machine Tool Company	325
National Tool Company	28-313
Nebel Machine Tool Co.	203
Neise, Karl A.	329
New Britain Tool and Manufacturing Co.	184
New-Hermes, Inc.	233
Newman Machinery Co., Louis	333-337
New Method Steel Stamps, Inc.	318
Niagara Machine & Tool Works	148-149
Nichols-Morris Corporation	121
Nicholson & Company, W. H.	271
Nicholson File Company	150
Nielson, Incorporated	292
Nilson Machine Company, A. H.	269
Noble and Westbrook Mfg. Co.	61
Noble Machinery Tool Co.	309
Norgren Co., C. A.	51
Northwestern Tool & Engineering Company	330
Norton Company	140-141

O	
Oliver Instrument Company	181
Oliver Machinery Co.	135
O'Neil Machine Manufacturing Company	102
Oriandi Gear and Machine Co.	30
Ottomiller Company, Wm. H.	280

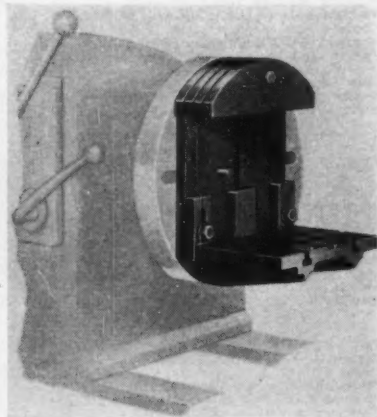
P	
Palley Supply Company	336
Pannier Corp.	88
Parker Machine Company, Inc.	297
Parker Stamp Works	194
Pedrick Tool and Machine Co.	206
Pivot Punch and Die Corp.	199
Plunket Machine Company, J. E.	333
Pope Machinery Corporation	12
Porter-Cable Machine Company	71
Portman Instrument Co.	304
Preis Engraving Machine Co., H. P.	142
Procurier Safety Chuck Company	79
Production Devices, Inc.	326
Pyrometer Instrument Company	330

Q	
Queen City Machine Tool Company	241

R	
R and L Tools	74
Racine Tool and Machine Co.	85
Rahn Granite Surface Plate Co.	318
Reading Machine Company	332
Reed Roller Bit Company	58
(Cleco Division)	
Reich Manufacturing Company, J. R.	332
Reitool Corp.	133
Richards Company, J. A.	327
Rimat Machine Tool Co.	156
Ring Punch and Die Company	280
Robbins Co., Omer E.	232
Rochelle Tool and Die Co.	170
Rockford Clutch Division	185
Rockford Machine Tool Company	154
Roll Feeds Corporation	247
Ross Operating Valve Company	92
Rotor Tool Company	63
Royal Oak Tool and Machine Co.	236
Royersford Foundry and Machine Company	222
Rutland Tool Service	291
Ryerson & Son, Inc., Joseph T.	104

S	
S & S Hinge & Metal Products Company	327
Sales Service Machine Tool Company	347
San Angelo Foundry and Machine Co.	205
Sanford Manufacturing Corporation	161
Schauer Manufacturing Corp.	168
Scherr Company, Inc., Geo.	314-330
Schmidt, Inc., George T.	43-302
Schultz and Anderson Company	134
Scientific Lubricants Company	302
Scientists' and Engineers' Association	337
Scully Jones & Co.	230
Sebastian Lathes (Div. Cincinnati Metalcrafts, Inc.)	83
Seibert and Sons, Inc.	152

Now . . . locate workpiece in two planes accurately and quickly



WRITE FOR FULL DETAILS

TO CENTER LINE on Engine and Turret lathes

Perfect for single piece, small, medium and large lot production of parts that are not practical or possible for chucking or face plate holding. You can use it for first, second or later operation work, and where close tolerances are to be held in relation to previous machining. Use it with or without sub-fixtures. Where a high-cost special fixture is required the Curtiss fixture with simple sub-fixture will slash your tooling costs.

Sizes: for 16" and 24" swing lathes
or larger.

— CURTISS —
ENGINEERING CO.
HARVEY • ILLINOIS



New CUTTERS

FROM YOUR OLD TOOLS AT A
FRACTION OF NEW TOOL COST

GUARANTEED NEW TOOL PERFORMANCE

Let us quote on the manufacture of special tools, both high speed and carbide. We can also produce specials to your blueprint specifications from our large stock of standard tools. Rush your blueprints to us for immediate quotation!

TAKE ADVANTAGE OF OUR EFFICIENT
TOOL SHARPENING SERVICE!
ALSO REPAIRING OF CARBIDE TOOLS.

MANUFACTURERS CUTTER CORP.
273 JEFFERSON ST. • NEWARK 5, NEW JERSEY

BRADFORD gives you YOUR BEST TOOL BUY!

**GRIND, BRUSH, POLISH
ALL CLASSES OF WORK...**

**Bradford
5" and 6"
Aerial Grinder**



From ornamental iron to heavy "I" beams. Tool has excellent balance. Powerful motors develop $\frac{1}{2}$ h.p. on 5" and 1 h.p. on 6"; has no-load speed of 3800 r.p.m. Ball bearing construction. Equipped with 5" and 6" general purpose grinding wheels. Length, 25"; weight, 17 lbs.

**FOR MAN - SIZED
DRILLING JOBS...**



**Bradford
METALMASTER
1" Heavy Duty Drill**

Plenty of drilling power—for shop work or out on the job—wherever you need holes in the heaviest kinds of work. This powerful Bradford drills 1" in steel; 3" in hardwood. Does reaming to $\frac{1}{4}$ ". Rugged construction. Internal collet; No. 3 Morse Taper. Pipe and swivel spade handles are detachable. 110 and 220 volt AC/DC motor.

Ask your tool supplier to demonstrate these precision Bradford Tools. Write for complete information on the Bradford line of portable drills, saws, sanders, polishers; bench and pedestal buffers, grinders.

**THE BRADFORD MACHINE TOOL CO.
662 Evans Street Cincinnati, Ohio**

Precision Since 1840

Sellew Machine Tool Company	328
Seneca Falls Machine Company	98
Service Machine Company	287
Sheldon Machine Company	260
Sid Tool Company	292
Sigourney Tool Co.	198
Simmons Machine Tool Corp.	301
Simonds Abrasive Company	64
Simonds Saw and Steel Company	68-69
Simonski Co., Gilbert S.	34
Skilaw, Inc.	172-173
Smit & Sons, J. K.	310
Snow Manufacturing Co.	55
Somma Tool Co.	335
South Bend Lathe Works	188
Speedgrip Chuck Inc.	328
Standard Electric Manufacturing Co.	217
Standard Pressed Steel Company	77
Standard Transmission Equipment Company	286
Sta-Put Lite and Equipment Corp.	321
Stevens Inc., John B.	332
Stow Manufacturing Co.	216
Stuart Oil Company, D. A.	200
Sturdimatic Tool Co.	313
Sturtevant Company, P. A.	286
Sundstrand Machine Tool Company	56
Superior Indicator Co.	321
Swartz and White	331
Swartz Tool Products Company, Inc.	245

T

Taft-Pelree Manufacturing Company	171
Tannewitz Works	37
Teeter Co., C. B.	308
Thermo-Electric Manufacturing Co.	269
Thomas Holst Co.	284
Thompson & Son Co., Henry G.	238
Thriftmaster Products Corp.	155
Tietzman Tool Corp.	316
Tomco Products Co.	310
Torit Manufacturing Company	183
Tree Tool and Die Works	28
Troyke Manufacturing Company	296
Twentieth Century Mfg. Company	331

U

U.S. Drill Head Co.	229
U.S. Products Co.	281
U.S. Steel Supply Co.	118
Union Wire Die Corp.	132
Universal Engineering Company	134

V

Van Keuren Inc.	52
Van Products Co.	332
Vascoloy-Ramet Corp.	139
Victor Machinery Exchange	345
Viking Industries	317
Vogel Tool & Die Corporation	255

W

Waldes-Kohinoor Inc.	67
Walker Co., O. S.	115
Walls Sales Corporation	152
Waltham Machine Works	329
Walton Co.	192
Wardwell Manufacturing Company	239
Warner & Swasey Company	35
Watts Bros. Tool Works	324
Wells Manufacturing Co.	190
Wesson Products Co.	143
White Dental Manufacturing Co., S. S.	191
Whitney Metal Tool Company	226
Whitton Machine Company	316
Willey's Carbide Tool Co.	285
Wilson Mechanical Instrument Div.	Back Cover
(American Chain & Cable)	
Wirth and Son, Carl	319
Woodson Tool Co.	334
Woodworth Co., N. A.	230

Y

Yoder Co.	154
Yost Manufacturing Company	155

Z

Zeiss, Carl	333
-------------	-----



SENSITIVE UNIVERSAL BENCH RADIAL DRILL PRESS

**Drills at ANY angle
or position of arm**

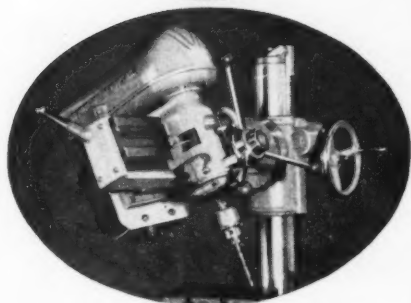
For drilling, tapping, light profiling.

1/2" capacity; 1/3 h.p. motor; 4 speeds: 840, 1200, 2400, 3600 r.p.m.; weight, 440 lbs.

Max. Distance Spindle Center to Column—21"

Max. Distance Chuck Nose to Base—16 1/2"

Greatest accuracy. Rugged. Free of vibration. Precision ball bearing mounted.



**Tilts to any angle up to 90°
in either position**

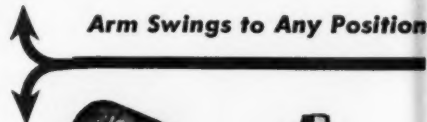
LATEST FEATURES:

- Vertical Adjustment
- Horizontal Adjustment
- Graduation for Tilting Angle
- Spindle Adjustment
- Precision Finish
- Hand Scraped
- Column and Spindle Precision Ground

Dealers' Inquiries Invited.

Write for FREE illustrated Bulletin.

LIBERAL RENTAL TERMS
ON TOOL ROOM AND
PRODUCTION MACHINERY



Arm Swings to Any Position



Nationally Distributed by

CAPITOL MACHINERY CORP.

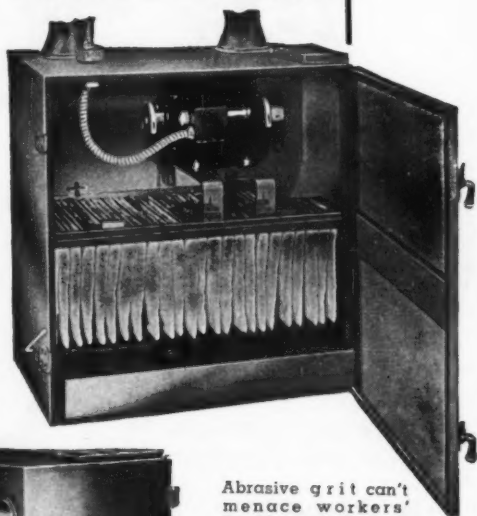
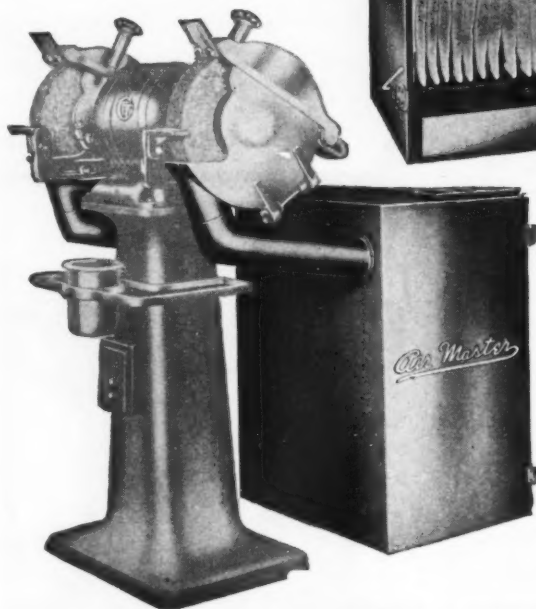
197-199 MOTT ST.

Phone WOrth 4-7615

NEW YORK 12, N. Y.

AIR MASTER PROTECTION

for Men
and Machines



Abrasive grit can't menace workers' health, can't damage costly machinery when AIR MASTER is on the job.

Flying particles from grinders and buffers are trapped as they leave the wheel and thoroughly filtered through fabric and steel wool bags before the air is exhausted.

AIR MASTER is a self-contained unit—rugged and dependable in every detail.

Made in four sizes—fits any grinder or buffer. Your plant needs AIR MASTER protection!

Write today for Bulletin 51-KB

Manufacturers of a complete line of Electric Drills, Grinders, Buffers, Portable Tools

TRADE

The Cincinnati

MARK

THE CINCINNATI ELECTRICAL TOOL CO.

Division of THE R. K. LeBLOND MACHINE TOOL CO.

CINCINNATI 8, OHIO, U. S. A.

**EXTRA
STRENGTH**



**EXTREME
PRECISION**



**ALLEN
TRU-GROUND
DOWEL PINS**

Won't Mushroom—Surface hardness 62-64 Rockwell "C" scale. Core hardness 52-54. Average case depth .010" to .020" depending on size.

Exceptional Strength—Single shear strength from 190,000 to 210,000 p.s.i., thanks to special Allenoy steel hardened completely through.

Precision Ground Microinch Surfaces—Accurate to $\pm .0001$ ". Checked with electro limit gauges. Ground to a microinch finish of 8 RMS maximum.

Two Standard Oversizes—Available as standard in .0002 oversize or .001 for repair work.

Buy Allen Tru-Ground Dowel Pins for Maximum Holding Power and Absolute Accuracy in Positioning



WARNING
Allen-Type screws aren't
necessarily Allen-Made.
Get genuine Prestar-Ford
Allen-Head screws in
this black and silver box.

ALLEN 
MANUFACTURING COMPANY
Hartford 2, Connecticut, U. S. A.

"ROCKWELL" * HARDNESS TESTERS

See them in Action!

at the
METAL SHOW
in DETROIT

•
October 15 to 19
•

BOOTH
A-342

J-Model
"ROCKWELL"
HARDNESS
TESTER



TUKON TESTER
◆ Four ◆
MICROHARDNESS TESTING

See how easy it is to be sure
of the hardness of metals you
process — by using **WILSON** Hardness Testing equipment

*TRADE MARK REGISTERED

ACCO



WILSON

MECHANICAL INSTRUMENT DIVISION
AMERICAN CHAIN & CABLE

230-T Park Avenue, New York 17, N. Y.

"ROCKWELL"
HARDNESS
TESTERS